

The University of Chicago

DEPARTMENT OF ANTHROPOLOGY

BULLETIN VI

The Stone of the Sun and the First Chapter of the History of Mexico

By

ENRIQUE JUAN PALACIOS

TRANSLATED FROM THE SPANISH BY FREDERICK STARR



THE UNIVERSITY OF CHICAGO PRESS
CHICAGO, ILLINOIS



STONE OF THE SUN (TONATIUH) AND OF VENUS (QUETZALCÓATL) CALLED THE AZTEC CALENDAR

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Published August 1921

Composed and Printed By
The University of Chicago Press
Chicago, Illinois, U.S.A.

INTRODUCTION

In the course upon *Mexico*, which has been given repeatedly to my students at the University of Chicago during the last twenty-five years, we have always devoted some time to the study of the "Aztec Calendar Stone." As a specimen of native American art it is of extraordinary interest; as a mass of symbols, in which the astronomical and chronometric knowledge of the ancient Mexicans is, in a sense, summarized, it is of the highest importance.

It has long been my intention to print a sort of study guide regarding the stone for the use of my students. My plan was to prepare a careful summary of the argument of each and every worker who had seriously attempted to interpret the stone; to arrange these summaries in chronological order; to subject them to critical investigation in order to extract from them what appear to be final conclusions; to add some original suggestions as to significance; and, finally, to point out what further study was necessary in order to a full understanding of the monument.

While I delayed, another worker has done a task so nearly like the one I proposed that mine seems no longer necessary. Mr. Enrique Juan Palacios, of the City of Mexico, has presented a paper, entitled *La Piedra del Sol y el primer capitulo de la historia de México*, before the *Sociedad Cientifica "Antonio Alzate,"* which has been printed in its *Memorias*. It is an admirable piece of work. I have felt that it would be better for me to translate it into English than to write a new work. Nor have I thought it desirable to recast his work or to alter it. I still think that, for students in a class, my method—presenting complete summaries of the ideas of each author, before attempting study of details—is preferable, but I present Señor Palacios' work as he made it. I have omitted some sentences or paragraphs which did not in any way affect either his argument or conclusions; there are also a few verbal changes and one or two additions, but these have been made by the author himself and have been translated from his copy.

Señor Palacios has made an actual contribution to our knowledge of the Calendar Stone. This is not to say that I am as yet prepared

to accept each and all of his suggestions. His long-continued and capable study, however, deserves and earns serious consideration of his views. Faithful examination of his work will show students what may be accepted as settled; it will also indicate what problems remain to be solved.

FREDERICK STARR

CHICAGO
June 21, 1921

THE STONE OF THE SUN AND THE FIRST CHAPTER OF THE HISTORY OF MEXICO

The famous stone of the Archaeological Museum of Mexico, from the moment of its discovery, has given occasion that men of ability and eminence should interest themselves in it.

Rare must be the traveler who does not admire the architecture of the metropolitan cathedral, whose towers, crowned by bell-shaped terminations, majestically distinguish it among all the basilicas of the world. It was precisely the author of a considerable part of this façade, and in particular of the towers, Don José Damián Ortiz de Castro, who made the discovery of the stone, under the pavement of the Plaza Principal, on the seventeenth of December of the year 1790.

They were about to bury it anew, imitating an archbishop who two centuries before had been guilty of so strange a blunder; fortunately the viceroy of the colony at the time was a man of the character of the second Count of Revillagigedo, Don Juan Vicente de Güemes Pacheco de Padilla. This able and progressive governor opposed the execution of their plan, ordering that educated individuals should take charge of the stone, that they should measure and study it, and that it should be transported to the Royal University and placed in a public place "where it should be forever preserved as a notable monument of Indian antiquity." With this act the said ruler, one of the most illustrious that New Spain ever had, once more demonstrated that talent and discretion of which he gave so many proofs.

The first to examine the monument with the interest and the scientific rigor which the work merited, and the first to draw and reproduce, with sufficient fidelity, the complicated relief figures upon it, was the illustrious Mexican astronomer, Don Antonio de León y Gama. This same modest and eminent savant was also the first to formulate an interpretation of the figures engraved upon the face of the monument; and his study with reference to it is of such sort that, although not final nor entirely correct, it has not only given the basis for all subsequent scientific studies, but remains a classic in the matter. Even today, when the decipherment of the monument goes largely

along paths which León y Gama did not indicate, the thesis of the illustrious author is partly sustained and will always be an important treatise of the subject.

The admirable monolith could not fail to attract the attention of a man like Baron Alexander von Humboldt. He examined it in great detail, being the first to classify its petrographic nature in scientific terms, earlier indicated with fair accuracy by the prolific writer, Don José Antonio Alzate y Ramírez, and finally determined with the precision of modern methods by the distinguished geologist, Don Ezequiel Ordóñez, who refers it to the group of olivine basalts. Humboldt confirmed also the weight which Gama had attributed to the stone by means of ingenious calculations, and reproduced the drawing made by the same scholar, illustrating with it one of the pages of his beautiful *Vues des Cordillères*. So far as concerned interpretation, he accepts completely the thesis of León y Gama (as thirty years later did a man of the ability of Albert Gallatin, who also made use of the drawing of our archaeologist), presenting it at length and fully discussing the chronological system of the aborigines and their theony and cosmogony. The vast knowledge of the German writer and his extensive journeys suggested to him various relations between the constructors of the stone, the Asiatics, and peoples of Southern America, an idea fecund in a certain way, but which has brought more ills than advantages to our archaeology, leading many investigators to devote their energies to tracing foreign affinities, instead of studying in themselves the products of the culture of Anahuac.

From that time up to near the end of the nineteenth century, no figure of first rank returned to the attempt of lifting the veil under which was hidden the guarded secret of the famous stone. Set in the lower part of the eastern tower of the basilica, savants and travelers coming from all parts of the world filed before the mysterious reliefs during more than a hundred years, contemplating it some with curiosity, some with wonder, all with admiration. It was there about 1805, when the talented Moxo relates that the common herd diverted itself with battering its figures and designs, although the learned "have not ceased to view it with the greatest astonishment and respect, considering it an original document which testifies to the notable knowledge of astronomy and geometry of the ancient Mexicans."

There, with permission of Don Lucas Alamán, at the time minister of state, W. Bullock, proprietor of the museum of London, took a mold of it for the first time, which he successfully transported to his

institution. The traveler relates that at that time (1823) the people of Mexico called the monument *reloj de Moctezuma* ("Montezuma's watch"), a statement which Brantz Mayor repeats in his work *Mexico as It Was and Is* (1844). Gama's drawing is reproduced in both books. (We may add that today excellent molds of the relief exist in the American Museum of Natural History of New York and in other foreign institutions.) There also was taken one of the most perfect existing photographs of the stone, which adorns the pages of the great work *Monumentos del Arte Mexicano Antiguo*; there also the expert and notable artist, Don José María Velasco, drew it with his customary fidelity and precision. Finally in the year 1885, the monument was transported to the place which it now occupies in the grand salon of the Museum of Archaeology.

At about this time, the able archaeologist, talented and illustrious historian, and eminent man of letters, Alfredo Chavero, produced a most brilliant disquisition, which for many years changed the course of ideas regarding the monument. Fundamentally contrary to the theory of Gama, although agreeing with it in some details, this study possesses very interesting aspects; nevertheless, rather than an adequate decipherment of the hieroglyphs it is a demonstration of the vast knowledge of Chavero in the general topics of archaeological science.

Following so luminous a work, there are no studies truly worthy of being taken into consideration, except that of Don Dionisio Abadiano, prolix and minute beyond any other, sufficiently erudite also, but in almost its entirety aberrant and full of unacceptable subtleties and arguments as distorted as arbitrary. We will say nothing very different of the work of Felipe J. Valentini, without denying, however, the merit of his other works to the German doctor.

As little can we admit, well elaborated and estimable as may be the work (*The Fundamental Principles of Old and New World Civilizations*) in which it is propounded, the thesis of Señora Zelia Nuttall, investigator to whom the archaeological science of Mexico owes so many services. The distinguished Americanist claims in essence that the central part of the monolith represents the circumpolar zone of the celestial vault, the *naolin* and the four rectangles comprised in it being an allegory of the movements of the Great Bear, which form apparently the cross or Buddhist swastika gyrating around the Pole Star, center of the system whose strange and notable fixity was the origin of the worship which the aborigines and other peoples

of the earth consecrated to it. Without descending to details, we will only say that the theory—although developed with the most powerful logic and extreme wealth of data—omits the analysis of the greater part of the signs and glyphs of the relief, which, without speaking of other serious objections, reduces the probabilities of likelihood. At all events, the work of the illustrious lady writer is a work of many merits.

An original and sufficiently probable hypothesis concerning how the relief was engraved is due to the expert and well-informed archaeologist, Don Ramón Mena. The official explanations of the Museum, published in its *Catalogues*—work of the illustrious writer and professor of archaeology in the institution, Don Jesús Galindo y Villa—and contained in notes and labels fixed to the objects in its collections—notes edited in part by Señor Mena and in part also due to the inspiration of Don Eduard Seler and of the notable savant and archaeologist, Don Francisco del Paso y Troncoso—describe the stone without pretending to interpret it, except in a very general way; in basis, and so far as concerns the monument of which we are speaking, they follow many of the ideas of Chavero, and in less degree those of León y Gama.

DESCRIPTION AND FIRST EXPLANATIONS

The stone of the Museum is a circular relief, sculptured in basalt, 3.63 m. in diameter. In truth, the entire surface of the monolith is found to be occupied by glyphs, distributed in seven zones or concentric circles; there are, further, other signs in the cylindrical projection of the relief, part of an enormous rock approximately quadrangular, whereon, with consummate mastery, the cylinder was worked.

At the center and of large size, is seen the image of the sun, under the figure of the old god (*huehueteotl*). He has a mask, the skin wrinkled at the sides, distinctive ear ornaments, protruding tongue (expression of light), elegant necklace of seven beads (symbol of celestial bodies) and the solar glyph on the forehead, accompanied by two numerals.

On one and the other side of this face, two opened and magnificent talons present the luminary as if it were suspended in the zenith, according to the happy expression of Señor Chavero.

Inclosing the face of the sun, and occupying the following circle, shows itself in large size the sign *naolin*, indicative of the movement of the sun between the solstices and the equinoxes. Four rectangles,

which contain the representation of the cosmogonic ages into which the indigenes arranged the history of the world, form this allegory. The figures sculptured in the said frames carry, all of them, four numerals; their symbolism has given rise to important studies ever since the time of Gama and especially by the learned archaeologist, Don Alfredo Chavero.

Artistically developed between the rectangular frames, with the shaft end downward and the point showing the meridian of the place, there is distinguished an arrow of elegant drawing at whose extremities above and below, to right and left, are read the dates *Ce técpatl* (with its attendant, *Tletl*) and below *Ce quiáhuitl* and *Ome* or *Chicome ozomatli*. Circumscribed, at the end of the arrow, and between the face and the claws of Tonatiuh, are glyphs and numerals of which we shall speak later. We may add that the very position of the arrow is sufficient proof that the monolith was placed vertically, and not horizontally.

Comprised within the same circle, to the right and the left of the rectangular frames of the *naolin*, are noted four great numerals. These do not relate to the said sign (which, by its very form, implicitly carries the name "four movements"), but to the face sculptured at the center of the stone. This being the old sun and being figured in a chronographic figure, a native of those times would without vacillation assign to it the value corresponding to it: it is the *huehueticatl* or century of the Indians, double and sacred cycle, which the ancient Mexicans called old duration or age; therefore the four numerals indicate four *huehueticatl*, which are 416 years. Such was the motive for not having figured Tonatiuh as in other representations, with a face radiant with life, but with the appearance of age; the stone confirms this repeatedly, as we shall see further on.

Sahagún, speaking of this chronological period and of its importance, expresses himself as follows:

The larger period of time which they counted was 104 years, and they called this count an age, and the half of it, which are 52 years, they called a bundle of years. This method of counting the years they had brought down from antiquity; it is not known when it began; but they held it for certain and as a belief that the world had to come to an end with the conclusion of one of these bundles of years, and they had a prediction and oracle that then the movement of the heavens had to cease, and they took as a sign the movement of the Pleiades on the night of this festival, which they called *toxiumpolpilia*.

In the central figure of the monument then it is not a question of the simple representation of the star of day; it treats rather of the chief chronological cycle of the aboriginal cultures, the true century or age of the Indians, as Sahagún tells us. The artist attempted to indicate, and in this face of an old man does perfectly indicate, a *huehuertiliztli*, a double *xiuhtlalpilli*: 104 years. The thought could not be better conceived nor better expressed.

Let us add that below the arrow there is another numeral; but it is not as large as the previous four, nor is it worked out in exactly the same way. Without doubt it should not be computed in the same fashion.

Let us consider the following circle, which is the third of the relief. Its description offers no difficulties, and its interpretation is the ABC of archaeological studies. It contains the twenty characters of the native month, symbols which—as they constitute the foundation of the calendars of the Nahua, Maya, Zapotec, Matlatzinca, and other races which vary in the designative terms, agreeing in the roots—we ought to consider as a common legacy from a civilizing population which served as a trunk to all the others. The signs begin with *Cipactli* and end with *Xochitl*. Mrs. Nuttall sees in these characters symbols of the native zodiac, and we do not consider the idea (suggested previously, more or less explicitly, by Boturini, Veytia, Fábrega, Orozco y Berra, del Paso y Troncoso and Chavero) absurd. The order is that well known from the monuments and the codices, to-wit:

| | | | |
|-------------|------------|-----------|----------------|
| Cipactli | Miquiztli | Ozomatli | Cozcacuáuhltli |
| Ehécatl | Mázatl | Malinalli | Ollin |
| Calli | Tochtli. | Acatl | Técpatl |
| Cuetzpallin | Atl | Océlotl | Quiáhuitl |
| Cóatl | Itzcuintli | Cuáuhltli | Xóchitl |

We may add that the style of the *Cipactli* appears here a somewhat peculiar one. Supporting themselves on this circle, and dividing the following one, display themselves four magnificent rays or pointers with curved base, which by their position indicate the principal divisions of the day: midday (*Nepantla Tonatiuh*), midnight (*Yohual-nepantla*), the hour of sunset (*Tonaqui Tonatiuh*), and that of dawn (*Iquiza Tonatiuh*). Gama established this symbolism.

Alternating with these, but less in size and with support upon the following circle, are other four rays, but with base not curved but

straight, which express the following hours. Yet smaller and resting upon the following zone are seen eight asps between the rays described; they indicate, surely, a smaller subdivision of time. In total, the day of the aborigines was distributed into 16 hours of 90 minutes each.

The fourth zone or circle contains two hundred dots distributed in groups of five (each group in a little frame) which are commonly designated with the term of *quintiduos* ("quintettes"). In the asps already mentioned (six of which are entirely visible and two concealed in such a manner as induces us to assign the same elements to them) are eight *quintiduos*, giving a total of forty dots. We ought yet to add the ten circumscribed in the arrow of the *naolin* and the ten placed between the face and the claws of the Tonatiuh. These last are dots like the others; but the necessities of distribution of the relief do not permit their being arranged in an actually identical form. Altogether they sum up to two hundred and sixty numerals of equal kind, a reading already made by archaeologists.

Until now it has been assumed that the elements in question represent the *tonalámatl* or *cecpohualli*, fundamental computation of native chronology. Nevertheless, this is an error. Further than the fact that that appears inscribed in another part of the relief, the distribution of the 260 numerals in groups of five, and not of thirteen, dots demonstrates by itself alone that we are not here dealing with the sacred book composed fundamentally of thirteens. The dots in question denote years, not days as has been supposed; and if they appear distributed in fives it is because they allude to years of the planet Venus, that is to say, the synodical movements of that planet, five of which form a cycle in the calendar of the aborigines for reasons which we shall explain later.

The dots of the fourth circle, joined with the other elements of the same kind which may be read in the relief, represent then a period of 260 Venus years. Taking the synodical revolution of the planet as very close to 584 days, the total amounts to 151,840 days, or 416 solar years, great cycle of the aboriginal chronology, repeatedly figured in the monolith, as we shall see in the sequel. It is inferred that the Indians carried on simultaneously two calendars, that of the star of day and that of Venus, and by their combination they computed the course of time; in this method, with purely astronomical elements, they formed their system of chronology.

Interrupted in its turn by the great and small rays, the fifth circle is formed of eight zones or glyphs which archaeologists have agreed in

considering solar. Six of these zones contain ten glyphs, and each of the other two contain five: in all there are seventy glyphs of the same kind, to which are added the three which border each of the eight asps before mentioned, and the ten, a little smaller but of identical form, placed between the face and the talons of Tonatiuh. In total, they sum 104 solar glyphs, indicative of so many other years. Here as little is it a question of days, as the archaeologists have claimed, identifying dissimilar glyphs of the relief in order to compute the 365 days of the year: a procedure arbitrary and of course illogical in a work of the magnitude of the one we consider here. In reality the circle expresses the Indian century, or *huehuetiliztli*, period already read in the face of the center. Later we shall see the motive for the repetition of the cipher.

Nothing concrete has been said until now about the following circle. Some call the figures that compose it temples; others have seen them to resemble leaves or mountains; some simply call them little arches; but no one has penetrated their exact significance. In the most authorized descriptions they have generally been designated with the descriptive term "pentagons" (Chavero) or "trapezoidal figures," symbolism of the most general kind having been attributed to them. If in passing beyond the third zone Peñafiel has said that the archaeologist entered upon the field of conjecture, with respect to this zone, the sixth in the relief, it may be affirmed that up to the present it has been enveloped in impenetrable mystery.

The monolith has no more interesting glyphs. Their number, their distribution, the form of the figure say sufficiently what they represent. They appear in four groups, separated by the great solar rays. The two upper groups present thirteen signs; and each one of the lower, twelve, it being necessary to presume the missing one, hidden by the plumes of the serpents which adorn this part of the stone. In total they sum up four groups of thirteen glyphs of the same form, the significance of which is somewhat of the most important which the relief contains; there is concentrated not only its own significance, but that of many of the other aboriginal monuments. It explains the tenacity with which the glyphs guard their secret.

The archaeologists have said that the characters of which we treat are a kind of pentagons. Without being such, speaking precisely, they may be considered as made up of five somewhat irregular sides; there is noticed, at the same time, the concavity of the inferior side.

This is the figure of the jewel of Quetzalcóatl, as may be seen in many representations: on pages 42 and 59 of the Codex Borgiano, which represents of great size the double morning and evening star; in the beautiful statue belonging to the Trocadero Museum; on page 16 of the Codex Borbonico; on page 17 of Codex Vaticanus A; and in others of the Codex Telleriano Remense, etc. The jewel shows an elegant outline with five indentations or sides, "figura de cinco angulos," as Sahagún says, and is slightly concave below. In converting itself into a chronographic glyph, it received many conventionalizations—Hamy has described them minutely in his *The Jewel of the Wind*—which we may see in the monuments; but all are alike in the important details.

Ah well, was it a result of fancy or was it due to deliberate intention that this form attaches to the jewel of the deity? The more important pictographs (e.g., the Dresden Codex) reveal this practice of the *tonalpouhque*: to take as a unity the five years of the planet which make a running with eight solar years. Such was the origin of the festival *atamalqualiztli*, celebrated at the end of this term. The unity thus formed was repeated thirteen times, as we see in the Dresden Codex itself (p. 24), in the Cospi, in the Borgian, in Vaticanus B, and in other documents. The conjunct equals 65 years of the planet, exactly equal to 104 solar, by virtue of the well-known equations:

$$\begin{aligned} 584 \times 5 &= 365 \times 8 = 2,920 \text{ days} \\ 584 \times 65 &= 365 \times 104 = 37,960 \text{ days} \end{aligned}$$

The form of the jewel is allegorical of the five movements of Venus, which make cycle with the eight years of the sun; corroborating it, see the eight dots at the bottom of the representation of the double star on page 59 of the Borgian Codex; see eight solar glyphs under the face of the stone figure of Tepezuntla (commonly called Tzontémoc) corresponding to the five circles which the same beautiful figure has upon the forehead. That this stone represents Quetzalcóatl (the star Venus) in his descent of eight days into hell, the form of the ear ornament, which is typical, manifests without a doubt.

But there was another motive for dividing the jewel of the deity into five parts or distributing it into five points. In developing the calendar of the star, the periods of 584 days are begun with the symbols *Cipactli*, *Cóatl*, *Atl*, *Acatl*, and *Ollin*, and continuing the series of Venus years, the same characters are repeated in identical order, giving for result that of the twenty day signs of the native month; only five preside over the revolutions of the star, a fact discovered by the learned Seler. The number results eminently symbolical of the planet.

We have then a little cycle of five revolutions of Venus equal to eight solar years, which are 2,920 days. Each of the frames inclosing five dots, each of the little pentagons, expresses this chronological value. Supposing the planet at the beginning of its matutinal apparition or its heliacal rising, it will have recovered the identical position, with respect to the star of day, at the termination of the cycle. The fact is a phenomenon of astronomical observation which could not pass unobserved to scrutinizers of the heavens like the Indians: and in order to commemorate it, they celebrated the festival *atamalqualiztli* of which Sahagún speaks. But we have seen that this unity is repeated thirteen times. There are two reasons for this: one, to equal with Venus years the great period of 104 solar years, a cycle equivalent to 65 synodical movements of the planet; the other, to equalize the two calendars, because when five Venus years have passed, the sixth commences anew with *Cipactli*, but this character goes this second time not accompanied by the numeral 1, but by 9, necessitating that the five years shall be repeated thirteen times, in order that *Cipactli* should return to be accompanied by 1, as at the beginning of the period, and the commencement of the one and the other calendar.

The cause of this phenomenon is known. The *tonalámatl*, that is to say, the series of twenty thirteens, runs through the book of the planet the same as through that of the sun, calendars, one and the other, which are made up by the combination of thirteen numbers in order with the twenty day characters, so that these may not be confounded on being repeated. As the number 584 does not contain an exact number of thirteens, there are twelve units over in the first Venus year, eleven in the next, ten in the next, and so on successively, so that *Cipactli* comes to be accompanied by different numerals, the thirteen times that it begins the year, until the 65 counts of the planet's calendar are complete. Although all archaeologists know this, we copy anew the distribution of the thirteens and of the day characters in the computation which we are considering.

Figures which accompany the initial signs of the Venus year, in a series of 65 years:

| | | | | | | | | |
|----------|-------|-------|-------|-------|-------|-------|-------|-----|
| Cipactli | 1—9— | 4—12— | 7— | 2—10— | 5—13— | 8— | 3—11— | 6 |
| Cóatl | 13—8— | 3—11— | 6— | 1— | 9—4— | 12—7— | 2—10— | 5 |
| Atl | 12—7— | 2—10— | 5—13— | 8—3— | 11—6— | 1— | 9—4— | |
| Acatl | 11—6— | 1— | 9—4— | 12— | 7—2— | 10—5— | 13— | 8—3 |
| Ollin | 10—5— | 13— | 8—3— | 11— | 6—1— | 9—4— | 12— | 7—2 |

With the beginning of the 66th year of the series, *Cipactli*, with the numeral 1, returns to begin the count like that of the 37,960 days passed, and on this same day the sign with the same number gives beginning to the 105th year of the solar calendar; one and the other count are thus adjusted to each other. Serving as a base to both the *tonalámatl* finds itself exactly at its first day:

$$584 \times 65 = 365 \times 104 = 260 \times 146.$$

Now we may understand the thirteen pentagons inscribed in each one of the four parts of the circle of the monument. They denote the number of times that the five characters enter as initials of the Venus year in one *huehueticatl*. They figure in this fashion thirteen times, and just so many times was celebrated in said cycle the festival of the planet, *atamalqualiztli*, always coinciding with *Cipactli*. And that the intention of the astronomer-director of the engraving of the relief was to inscribe this number of glyphs, is plainly seen in the upper groups of the sixth circle; without aesthetic prejudice and almost compelled by the demand of symmetry, other pentagons might very well have been located in the space covered by the bands which issue from the serpents' tails. The artist might, with the greatest good taste, have placed six glyphs in this double empty space, but he deliberately prolonged the bands instead. His proposition could not be made more manifest. The purpose was the engraving of a number, not of an ornament. This suffices to show us that there are no simply decorative signs in the relief, incomparable synthesis of art and science.

But there are four groups of Venus cycles, four zones of thirteen pentagons. To what necessity of the system can this repetition correspond? The synodical movement of Venus being taken as 584 days, there result 37,960 for each group, or 151,840 for the total of 52 pentagons of the circle. This period represents exactly 416 solar years. In other terms, if each group signifies 65 Venus years, equivalent, as we know, to a *huehueticatl*, the four correspond to as many sacred cycles, which is what is indicated by the great numerals that surround the head of Tonatiuh, conformably to the interpretation which we have already given. One and another circle, the second and the sixth, say exactly the same thing: 416 solar years. The fourth zone expresses an equal thing: 260 Venus years, number which is considered sacred. Everything in the monolith concurs in declaring one single and well-considered thought; we shall speak of its origin and admire its profundity and transcendence. Meantime we

say, as proof that we are not dealing merely with arbitrary theories or purely speculative systems, that the numbers 37,960 and 151,840 appear in the Dresden Codex. Förstemann, its able interpreter, has read them in that admirable astronomical book.

Let us pass to the seventh zone, which forms the border of the monument, figuring two serpents which end in colossal heads of strange and elaborate decoration. This is the pre-eminently beautiful circle of the relief perhaps the most studied, concerning which there have been proposed the largest number of conflicting conjectures. Here we shall confirm the key of the interpretation of the monolith and shall see the sum and confirmation of the preceding data.

Two magnificent serpents encircle the relief and at the lower part of the stone join heads, from whose opened throats peer out human faces confronting each other. The body of the serpents is found to be ornamented through its entire length with an artistic and imaginative richness which, considered simply as decorative, would be a masterpiece; if more than decorative, these glyphs involve precise dates and astronomical symbolisms—the work becomes one of genius than which certainly the nations of antiquity have left nothing more admirable.

The signs distributed over the body of the serpents are of three classes: numerals, groups of bars or strokes, and a glyph considered a conventionalized representation of fire; further, four tyings in the tails of the monsters.

All of these elements possess concrete meaning. In the so-called flames, which issue from the back of the serpents, there are also groups of four thick bars. In sum the zone includes the following elements: the heads inclosed in the throats of the serpents, with characteristic headdress and attributes; the scales or body divisions of the creatures themselves; numerals made of dots and groups of four bars distributed in the bodies themselves and in the two terminal bands which go off from the tails; other glyphs situated in the inner line of the body of the serpents, which have been considered conventionalizations of fire, although without noticing that these signs bear numerals; and lastly the date indicated by the points of the tails and included within a frame, in the upper part of the monolith. This date is found figured with a cane and thirteen points (*13-ácatl*).

Let us commence by observing that the heads which appear in the throats are distinct beings or deities, differentiated by characters

which permit their identification. Both heads protrude the tongues, joining or touching them together in the clearest fashion; here is symbolized the thought of the relief. Archaeologists admit that the tongue symbolizes light in the idols and pictographs representing stars, and it is not possible to doubt it after the demonstration which, with the peculiar sagacity in which no one has equaled him, Señor Chavero gave upon this point, studying the greenstone figure, discovered in Papantla, which in place of the tongue presents the mouth perforated for the material passage of light. In a similar manner, the face of Tonatiuh, central to the relief, has the tongue out signifying the irradiation of light through the universe. This considered, what could that be which in so graphic a fashion joins these deities who peer out from throats of time, metaphorically figured by the serpents? The light itself; but their special lights, since here different beings are in question, that is to say, the lights of special celestial bodies. It would be impossible to indicate in more expressive and artistic form the concurrence of two chronological periods determined by the combination of stars which renew the same relative positions which they had before.

Let us undertake to identify the deities; if known, it will be easy to recognize the cycle. The figure of the left semicircumference of the relief is undoubtedly the sun himself. It is distinguished by the glyph of the forehead, identical with that which adorns the face of the central *huehueteotl*, although without the two numerals which accompany that. The head on the opposite side has not this glyph. The ear ornament, similar to that of Tonatiuh, distinguishes it; the face with the other serpent lacks this. The head of the solar snake has before the nose the sign of the double cane, a character closely related with Tonatiuh and with Xiuhtecuhtli, as is seen in the codices. *Ome ácatl* (2-cane) is one of the various names of the sun, and two are, in fact, the figures of the cane here represented. Others have recognized in the glyph a handful of herbs, giving us, anyway, the name of Xiuhtecuhtli (lord of the herb and the year). As little does this symbol appear in the face of the opposite serpent.

On the other hand, the figure on the right shows a netting clearly defined, peculiar to Quetzalcóatl in his multiple representations; in front of the nose is a symbolical glyph which we cannot identify because the stone is badly destroyed in this part. . . . But that which in a special mode distinguishes the two beings is the ear ornament (*nacochtli*), which is lacking in the figure to the right and identical with

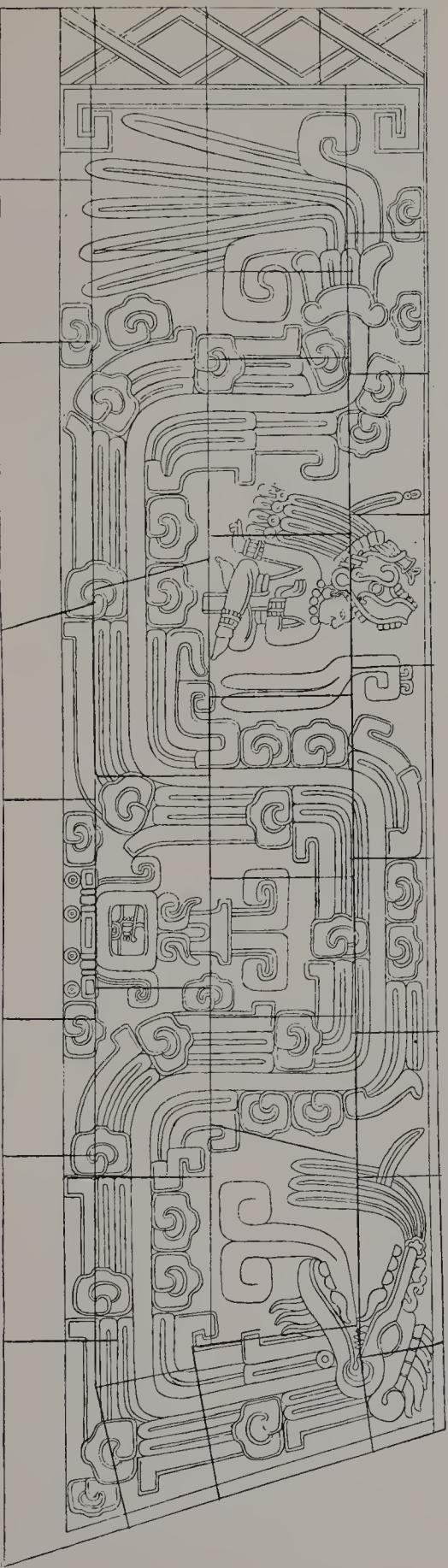
that which adorns the central Tonatiuh in the figure to the left. The ear ornament possesses distinctive value in the representations of deities. More is not necessary for our purpose; it suffices to affirm that the sun is the star represented in this figure.

What star can it be that the other serpent symbolizes? It is not necessary to meditate long in order to understand it: it is Quetzalcóatl or Venus, the beautiful twin or the plumed serpent, a deity often actually represented in this latter form. Symmetry compelled the artifice of representing by another plumed serpent the corresponding solar cycle; furthermore, the serpent involves the general symbolization of time. The face of Quetzalcóatl wears a net, adornment lacking to that of Tonatiuh; it has no ear ornament, and the sign placed before the nose, now badly defaced and difficult to determine, was without doubt that distinctive of the divinity; yet it appears as if it were *i*-cane, unlike the double one of the sun, which gives us one of the names best known of the personage, *Ce ácatl* (*i*-cane), the day of his birth.

The figures identified, it is not difficult to state what chronological period is symbolized in the reunion of the tongues, that is to say, of the respective lights of the stars. It is the *huehueticliztli*, the sacred cycle of 104 years, indicated in the wrinkled face of the central Tonatiuh; it is the period at whose end the deified celestial bodies return to occupy a certain position in space and the tables of the respective calendars adjust themselves, attaining harmonious development.

Profound the thought of the astronomer-director of the monument! Here is the form in which the relief expresses it: chronology is born from the movements and relative situation of two stars. In the development of their harmonious revolution, they engender chronological cycles equal as to the time of their termination, but distinct in that which concerns their origin, since the deities who determine them are diverse. Hour after hour the apparent march of the sun and of Venus through the heavens are scrutinized and scrupulously noted in the respective calendars, which advance, one ever upon the other, until 37,960 days course by, an exact cycle, and then the sacred books (*teoamoxtli*) complete their round, coinciding with mathematical precision in number and symbol in the thirteens and the twenties of that marvelous arrangement.

Fact in truth surprising: in that same moment the stars approach each other in the celestial vault. If the preceding *huehueticliztli* began coincidentally with the matutinal apparition of Venus, another time



HALF-FRONT OF THE BUILDING OF XOCHICALCO

Cycle of 65 Venus or 104 solar years. The double volute (new fire) bears the symbol of the tying of the (52) years, with four numeral marks. The other plumed serpent has the same glyph, harmonizing between both the cycle of 416 years.

THE FOUR CHRONOGRAPHIC CYCLES OF VENUS (QUETZALCOATL)
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the planet will find itself in the same position; and seeing it then so near the star of day, well might the aboriginal priests imagine that the deities confronting each other kissed, touching tongues, at beginning the new pilgrimage through the vault of space. (Here we will mention the following interesting fact: According to calculations of the Berlin astronomer, Berberich, undertaken at the suggestion of Mrs. Zelia Nuttall, the evening star and the new moon were visible on the horizon of the valley of Mexico, half an hour after sunset, on March 14, 1507, date of the new fire for the Indians.) Together with so poetical, exact, and admirable an allegory, they cherished the persistent tradition that one of these encounters was to bring about the destruction of the world.

Let us continue the analysis of the seventh zone. If the heads which face each other, joining tongues, give the *huehueticatl*, in the body of the serpents is directly indicated the number 416 which we have met in other parts of the relief. The reading is made from the groups of four rays, interpreted until now as symbols of fire and in various other fashions, all arbitrary or at least vaguely symbolical, as emblems of the highest indefiniteness. Nevertheless, their meaning is most clear: each group says *ácatl*, *técpatl*, *calli*, *tochtli*, names of the four successive years in the ordinary chronology. Very well, the serpent symbolical of the sun presents 52 groups of four rays equivalent to 208 years; added to the 208 corresponding to the other serpent, we have the total of 416 solar years, expressed this time directly, a most interesting fact which we are the first to indicate. Here there is no necessity of recurring to allegorical conceptions. And so deliberate was the intention of inscribing in each one of the serpents precisely 52 groups of rays that the artist, not having sufficient space, was compelled to add those bands which issue from the points of the tails, the only element of the relief which might appear somewhat arbitrary or at least not rigorously aesthetic. They are indispensable for the placing of the four groups that were lacking, already three having been distributed at the border of the monument, above the tails, five in the triangular ends of these, three in each arc of its twelve scales, and four in the throats and plumage. The total figure is classic in Indian chronology: there are 52 groups. This number appears in each serpent, a careful examination of the stone sufficing to demonstrate the fact: if up to the present none of the draughtsmen and lithographers who have reproduced the stone—except the most skilful

Iriarte, who devoted four months to the work in order to illustrate a study of Señor Leopoldo Batres—copied this and some of the other elements with exactness, it is because, the meaning of the glyphs being unknown, their number and complicated distribution easily caused them to make errors. Further on we shall say in what the principal errors have consisted and shall speak of one very curious artificial anomaly of the stone.

We have still to explain the signs which form the scales or divisions or the body of the serpents and to count the numeral dots placed at the border of the stone and around the said divisions. Concerning those Beyer and other archaeologists maintain that they are symbolizations of fire. We have no reason to deny it; but our own opinion is that together they indicate the number of cycles or meetings of Venus and the sun, registered in the firmament and in the calendar departing from some certain date; later we shall see what this may be. With respect to the dots, Señor Chavero counted them and interpreted them well, finding in them the number of days in the native year. Nothing more logical: the cyclical coincidence of the 104 solar years and 65 Venus years is effected by the aggregation, one after the other, of series of 365 days. It was natural to place these dots where we find them. And they do not find themselves duplicated in the two serpents because it is the common element of both reckonings; it was sufficient to inscribe them once.

We, however, differ somewhat from Señor Chavero in our way of counting them. There are ten dots each in as many scales, there are eighteen in the single scale which follows the tyings or ligatures, twelve more are circumscribed in the triangle which forms the tail. In sum there are 130 dots on each side, or 260 in going all around, which gives us the fundamental basis of the chronology: the *tonalámatl*. If, on the other hand, we count the 63 large points of the border of the stone, added to the hundred of the first ten scales, we have 163 numerals, and with the 18 which follow the tyings, they sum up 181 on each side, or 362 in the entire circumference; almost hidden within the claws of the first scale (the first on each side, of course) are two other points, that is, four altogether. In sum there are 366. This is the result which we obtain, and thus we shall state it, even if in this case it appears a little defective; but we do not attempt, as some interpreters, to fit the facts to our theories, but from the facts themselves to infer the true decipherment. It might be admitted that this last dot signifies the intercalated day: the native bissextile.

As for the four tyings located on the tail of each serpent, archaeologists have been in accord in attributing to them the value of so many *tlapilli* of 13 years, four of which, as everyone knows, formed the classical *xiuhltalpilli*, *xipoualli*, or *xiuhmolpilli* of the chronological reckonings: 52 years. Each serpent has four tyings, that is to say, 104 solar years are symbolized in the total of the representation. Thus is confirmed the chronological value expressed by the meeting of the heads of the sun and the planet.

We may add that, on the projected part of the cylinder, there are other glyphs, composed in essence of butterflies with stars, groups of flint knives (*técpatl*), and dots to the number of 156.

DATES

We arrive at the important matter of the dates inscribed upon the famous monolith. One only has until today been definitely fixed by archaeologists: the *13-ácatl* sculptured within a frame between the tails of the serpents. It is the prominent date of the stone, the one engraved with the most deliberate purpose; its position shows it such.

No one is ignorant that the capital defect of the chronological system of the Indians is that the names of the years repeat themselves every 52 years, each *xiuhmollpia*. The *13-ácatl* (13-canis) of the tablet may be the year 1479, which is the one generally admitted, and 1427 and 1375 and 1323 and 1271 and 1167 and 1115 and 1063 and 699, etc., etc. It is certain that the minute account of Duran, invoked by Don Alfredo Chavero, gives much force to the presumption that the date expresses the year in which the monolith was completed, during Axayacatl's reign, in 1479. More than that, the stone was in the great temple of Tenochtitlan; it was found in those precincts; there they buried it again between 1551 and 1569, and there later on it was rediscovered, remaining in the base of one of the towers of the basilica until its transference to the site which it now occupies in the museum. There are reasons, then, for believing that it is the stone described by the friar, the consecration of which was the object of so great ceremonies and to which alludes the statement of the natives, therein cited, that it bore "the figure of the sun." Tezozomoc gives a similar account.

Withal, this does not go beyond supposition, and there might be reason for doubt amid the multiplicity of conflicting opinions: that the stone was completed in the time of Chimalpopoca, as Don Antonio Peñafiel believed; in 1352, as Abadiano asserted; in 103 or 231, dates

which some have claimed to read in the relief; and in 699, and that it was made by the Toltecs, as there are very strong reasons for believing. What we may indeed affirm is that we have not here the date with which the last sun or the historic sun began, as Joyce says, and Spinden repeats, because the statements are in agreement, not only in the Aztec traditions but in the Toltec, in assigning the sign *Cetécpatl* (1-knife) to this event: the codices prove it without any manner of doubt. What, then, will be the date designated? We believe that the stone itself will yield the means of solving the problem.

Let us enumerate the dates of the relief. In the upper rectangular tablet we have seen the one upon which attention has been most turned, the date in which we believe the monument was completed: 13-cane.

Near the face of the sun, in the next following great circle, it will be remembered that we meet with a flint knife with one dot, that is *Cetécpatl*. Together with the *técpatl* is seen the *mamalhuaztli*; sign of the new fire.

In the designs like flames or half-feathers, which project from the inner border of the serpents, four stout bars are seen upon each.

The peculiar position of these flames, almost separated from the body of the serpents, symbol as we know of time, seems to us to express previous epochs or cycles, which must be considered as past with reference to the actual era of the world, directly represented in the serpents. They are links separated from the allegorical circle of time. In consonance with the general significance of the glyphs, it does not seem to us illogical to attribute to the said figures a cycle of 416 years, or, what is the same, to give to each bar the value of an Indian century, a *huehuetiliztli*; we shall see the hypothesis confirmed.

Each flame is the emblem of a spark of light, of an irradiation of solar fire through the universe, irradiation which in the life of the orb is like a flash, but which for the limited existence of man attains the term of a cycle of 416 years. Being twelve the flames of the entire round, there result 4,992 years, date for which we shall later seek associations. Adding to it the 104 years represented by the meeting of the heads, we arrive at 5,096, a most important date which will give us extraordinary revelations. The importance of the date seems to have led to its repetition, and we meet it figured in the projection of the cylinder. Let us state now, to be proved later, that this year 5096 was a 13-ácatl; and do not lose sight of the fact that the reading

of the number is made in the bodies of the serpents, whose tails indicate precisely the frame of the 13-cane.

Let us see now the symbols of the projection. Until the present they have been considered either merely decorative or emblems of the Milky Way. They might metaphorically be the latter; but they have, at the same time, an exact chronological significance, an idea suggested by Abadiano, although our own judgment in this matter differs in various respects from his. There are two *técpatl* (flint knives) which face each other, alternating with *itzpapálotl* (obsidian butterflies), which in our conception is the constellation Orion: the small circles crossed by lines clearly show that an asterism is in question.

There are 32 butterflies; assigning to each the value of a *xiuh-mollpia* (cycle or bundle of 52 years) gives us among them all 1,664, whose significance we shall seek opportunely. With respect to the knives (*técpatl*), they number 64, or, as they are in couples, 32 groups; attributing the same value to them, not an arbitrary hypothesis as we shall see, there is obtained the number 3,328, the double of 1,664, which is the precise product of four periods of 416. Summing this number 3,328 and the preceding 1,664 completes the important date read in the surface of the relief: the year 4492; notice that the series of elements with which we have encountered it are three in accord. One reading confirms the other. We shall undertake to harmonize them with our chronology.

A third date may be read in the monolith. Each serpent presents twelve scales, or divisions, and each one of these incloses a glyph, symbolical of fire according to the archaeologists, which is accompanied by a half-numeral, that is to say, a half-circle.

The figure resembles the glyph of the new fires, frequently represented with a double volute, as may be seen, for example, in the edifice of Xochicalco; and the supposition is so much the more probable, considering that the symbolical serpent ought to grow by equal parts or periods, and here the four tyings of the tail tell us that the serpent represents primordially a chronological value of 52 years. But the half-circles indicate that in each scale only the half-period is to be considered. There being 24 of these divisions, their summation embraces a total of 624 years ($24 \times 52 \div 2$), which, added to the 5,096 gives us the year 5720 of native reckoning.

Soon we shall harmonize this new date with our chronology. If we add the 156 dots inscribed on the cylindrical projection or edge of the relief, near the butterflies and the flint knives, we attain the date

5876 last in time of those which are read in the monolith. All pertain to the chronology of the Indians; it is necessary to relate them if possible, to our own.

Let us repeat in order, for greater clearness:

| | |
|---|---|
| Direct, that is to say, by summation of elements | $\left\{ \begin{array}{l} \text{Year 4992 (twice)} \\ \text{Year 5096} \\ \text{Year 5720} \\ \text{Year 5876} \end{array} \right.$ |
| Native reading, for us indirect | $\left\{ \begin{array}{l} \text{I3-ácall} \\ \text{I-tecpatl} \end{array} \right.$ |

Two other dates there are, *Ce quiáhuitl* (1-rain) and *Chicome ozomatl* (7-monkey), below the great central arrow.

INTERPRETATION

The historian Ixtlilxóchitl, great-grandson of the last king of Texcoco, is held to be the most faithful and informed conservator of the traditions, history, and cosmogony of the Toltecs. There reigns, however, the most extraordinary confusion and an incredible disorder in many of the dates which he gives, which is due to the fact that he did not know how to harmonize the native with the Christian chronology; but the basis of his narrative, submitted to a vigorous analysis and judiciously pruned, very nearly approaches historic truth, a *cabildo* of Indian savants (that of San Salvador Quautlancingo) having certified to the exactitude of his statements. Men of no less merit than Clavijero, Prescott, Count Cortina, Fernando Ramírez, and Manuel Orozco y Berra, have rendered justice to this man, unduly unesteemed by some.

According to the data of the *Relaciones*, the human species from the creation of the world on had been three times destroyed: the first time by inundations (*Atonatiuh* or the sun of water); the second by hurricanes (*Ehecatonatiuh* or the sun of the air), after a lapse of time equal to that which passed before. The third age concluded in the year 4992, which is just 12 complete cycles of 416 years, and ended by terrestrial calamities (wars, eruptions, earthquakes, etc.), ". . . . those of this earth had another destruction, who were the giants; and thus also many of the Tultecs died in the year *Ce técpatl* (4993); and this age they called *Tlacchitonatiuh* (sun of earth)." In it Ixtlilxóchitl places the Ulmeas and the Xicalancas, gives data

regarding Quetzalcóatl, and speaks of the first pyramid of Cholula. The destruction of the giants (*quinamézin*) marked the end of the era in 4993.

Be it noticed that the number is equal to three exact periods of 1,664 years, in its turn made up of 4 cycles of 416: and let us not forget the pronounced tendency of the Indians to distribute the evolution of their history in fixed periods of equal duration. Thus is explained the allegory engraved in the center of the relief which represents the four ages of the world, the duration of each one of which appears determined by 4 dots, the chronological value of which has not been discovered until now. It is easy for us to suppose that the Toltecs, always obedient to the tetranary conception which permeated such diverse phases of their social organization, their philosophy, and their religio-cosmogonic beliefs, would assign to each period, even if it had scarcely begun, 1,664 years, number formed by four great cycles of 416 years, made up, they also, of four *huehuetiliztli*. According to this, the dots on the tablets are valued each one at 416 years, like the flames from the bodies of the serpents and other diverse elements of this admirably co-ordinated product of talent.

The above might seem to be speculative; but it is a fact that the Texcocan chronicler fixes the date 4992 and that this is read twice in the relief. Ah well, when 4,992 years had run their course, three ages only had been completed; 104 years later, Ixtlilxóchitl affirms that the Toltecs initiated a new chronology, "they added the bissextile, in order to adjust the solar year to the equinox," and in fine, they perfected their calendar, determining the rules relative "to the months, the weeks, and the signs and planets": the event occurred in *Ce técpatl* (1-knife) 5097, counting from the creation of the world in the Indian cosmology.

The important *Anales de Cuauhtitlan* (codex which surpasses all those known in the antiquity and precision of its chronology, which embraces eight great cycles), considered as in apparent disaccord with the Texcocan historian, in reality confirm the capital data of Ixtlilxóchitl. They locate the arrival of the mysterious nation of the Ulmechas, in the beginnings of the third age, very nearly a thousand years before, Christ, and categorically fix the beginning of the second Toltec monarchy—because in remote times they had constituted another—in the year 674 of our era. Twenty-six years later, the year 700 was *Ce técpatl*; and all the traditions affirm that the Toltecs initiated a new epoch in *Ce técpatl*.

On his part, the canon Ordóñez de Aguiar, to whom are due the most trustworthy data which we possess upon the ancient inhabitants of Chiapas, stated at a little less than a thousand years before the vulgar era the apparition of the Quich'es, a people mysterious until the present, in whom, however, we are not the first to suggest affinities with the Ulmeas. Brasseur de Bourbourg discovered many most interesting things. With the establishment of the Toltec monarchy or some analogous event of importance, such as the regulation of the chronology, we have seen that the period called the fourth age of the world began.

Very well, if the third age began 1,664 years before that event, its commencement dates from the year 964 B.C. Ordóñez has discovered in the traditions of Chiapas, that "almost a thousand years" before our era, took place the apparition, and began in our territories the migrations, of the Quich'es. Brasseur de Bourbourg, with data from the codices, indicates the coming of the Ulmeas in the Plateau in the year 955 B.C., a date admitted by Chavero in relation to the Vixtoti, who were fundamentally the same people; then is "when the sun began to divide the lands between men." There is but nine years' difference from 964.

We shall have to infer that the Ulmeas and the Quich'es were the same people, which explains to us the arrival of the first from the east. Some circumstance set them in movement about a thousand years before our era, and about the year 964 or 955 they began to show themselves in the high table-land of Anahuac, coming from the direction of the Gulf, as all the traditions assert. It is necessary to admit the probability that they constructed the first pyramids and other monuments, as legend persistently claims. Sahagún, Torquemada, and various chroniclers collected the story from the lips of the Indians, and in our own days Bishop Plancarte y Navarrete urges it with powerful arguments. Also Waldeck, Lenoir, and Orozco y Berra indicate the event as a thing about three thousand years past.

Somewhere about the year 596 of the vulgar era, date suggested by Clavijero, there appeared on the Plateau, or at least began their movement, the advance guards of the Toltec migration. The best documents, the *Anales de Cuauhtitlan* among them, agree that the land was then occupied by the Ulmeas. Some grave event, perhaps the last manifestations of volcanic activity, developed at the time, principally in the valley of Mexico, permitting the newcomers to witness the last ruins of the catastrophe in the regions which had been occupied

by their predecessors; the vestiges of human work found under the lavas of Xictli and of Cerro Pelado in the Pedregal of San Angel and on both slopes of Ajusco strongly corroborate this hypothesis. It was then the year 4992 in the chronology of the aborigines. After the cataclysm the Toltecs employed another 104 years, a *huehuertiliztli*, in establishing themselves in the district, and, in the year 700 of our era, founded their final seat, initiated a new period in the fourth age of the world, arranging the chronology, consolidating their monarchial institutions, and electing their first king.

Chavero agrees with these data, although he believes that six years earlier, in 694, some very important event occurred, which some, like Orozco y Berra, connect with the dedication of the pyramids to the astronomic cult; but he accepts the mentioned date anyway. Torquemada had gathered from the traditions which came within his reach the same date 700, adding that the Toltecs had "wandered" for 104 years before, a statement which accords with others that we have. Clavijero and other authors vary slightly as to the founding of Tula, assigning the dates 661, 667, 674—the *Anales de Cuauhtitlan* gives this—and even 694, given by Motolinia as the year of the beginning of the epoch; but the date mentioned (700 A.D.; *Ce técpatl* in the native calendar), whether we relate it to that event or to the exaltation of the first monarch, best resists analysis for which reason the erudite author of the first volume of *Méjico a través de los siglos* (Chavero), after a thorough investigation, decides in favor of it. The *Anales* mentioned, although they declare that Tula was founded in 674, add that the nation existed for twenty-seven years without a monarch, that is to say, they arrived anyhow at the notable date 700. It cannot be denied that the date floats with singular persistency upon the tumultuous waves of tradition. Buelna, whose talent and breadth of documentation no one denies, also encounters it in his investigations, although the learned author of the *Peregrinación de los Aztecas* refers it to one of the principal stations in the journey of the tribe of Tenoch—the arrival at Mexcala or Coatlicamac—an assertion with which we do not agree, because it conflicts with the statements of the Codex Ramírez, of Duran, and of Chimalpahin, who unanimously assign a much less ancient date to that event. But even if it is not related to the race of the Mexi, the suggestive thing is that this date appears in all the studies, so that surely it does allude to some event of capital importance in the history of the aborigines; and all the circumstances had us admit that it treats of the Toltecs.

The relative littleness of the discrepancies which we mention in itself manifests the effective exactness of the chronology in question. There are those who (Seler, Joyce) in place of the year 700 prefer to assign the initial references of the document of Cuauhtitlan, relative to the Toltecs, to the year 752; the fact that this date is just a bundle of years after the other, united to other testimonies, confirms our opinion that that is the correct one.¹ Ixtlilxóchitl and the *Anales de Cuauhtitlan* result then on the whole in agreement: the year 700 of the vulgar era is 5097 of the chronology of the Indians.

Here follows a most important passage from Ixtlilxóchitl, which one might almost say was directly deduced from the data of the relief:

. . . . In the year 5097 of the creation of the world, which was *Ce técpatl*, and 104 from the total destruction of the *quinaméztzin* (giants), there being peace throughout this New World, all the Toltec savants came together, the astrologers as well as the other arts in Huehuétlapallan, head city of their kingdom, where they treated of many things such as the events and calamities that had happened and the movement of the heavens since the creation of the world.

There leaps to view the allusion to the famous meeting of Toltec astronomers, which certainly did not occur in the remote district of the Gila, as has erroneously been claimed—in any event, there were various of these assemblies—meeting in which was made the re-organization of the calendar. This important reunion took place in the year 5097 from the creation of the world (native chronology), year that was *Ce técpatl* in its series (commenced with the same name and number).

We have before seen that some event of the greatest importance for that people occurred in the year 700 of the Christian Era, and the synchronological tables (see those of Veytia) tell us without room for error that that year 700 was *Ce técpatl*. At the same time, the paragraph of the Texcocan chronicler states that the third age of the world ended in 4992, since that 104 years before 5097 the *quinaméztzin* perished; this was the *Tlacchitonatiuh*, or the sun of the earth (*Tlattonatiuh*). So that the Indians considered their third epoch finished in the year 506, and it is to be noticed that three historians, Torquemada, Clavijero, and Veytia, are in harmony regarding this

¹ And Seler himself, so learned and well documented generally, studying similar problems affirms (*Orígenes de las Civilizaciones centro-americanas*) that the beginning of the Toltec culture and of the system of the *tonalámatl*, or “the historic sun” for the Indians, dates from an epoch which oscillates about the year 700 A.D.

date; but as they delayed a century (104 years) in consolidating and regulating the calendar, they adopted the year 700 for the chronological beginning.

Ah well, the monument of the museum shows the two dates clearly: in the glyphs on the backs of the serpents, which summed with the 104 years of the meeting of the heads give the number 5,096, and in the glyphs at the margin of the stone, alluding to the facts already passed, which express the number 4,992. In order to confirm it with noonday clearness, here is the character *Ce técpatl*, joined to the face of Tonatiuh in a prominent part of the relief; here are also the four cosmogonic ages; here at the edge of the stone the hieroglyphs alluding to the three ages completed. The reference could not be more explicit. The monolith appears worked expressly to record the facts discussed at the memorable assembly of the astronomers, that "movement of the heavens and the calamities that have occurred since the creation of the world." Already we know what these were: Chavero has read them to perfection in the rectangles which surround the *naolin*: *Ehecatonatiuh*, *Tletonatiuh*, *Atonatiuh*, and *Tlaltonatiuh*, which was the present, initiated by *Ce técpatl*: the ages, suns, and catastrophes of the air, fire, water, and earth. Already we know the meaning of the "movement of the heavens," that it was nothing else than the cycles of 104 and 416 years, determined by the harmonious interlocking of the periods of the sun and of Venus, which is what the union of the magnificent serpents symbolizes.

And what is the native year 5097 in our chronology? The synchronological tables, Ixtlilxóchitl, and the *Anales*, each in its own style, tell us: This *Ce técpatl*, commencement of the Toltec epoch within the fourth age of the world, corresponds to 700 of the vulgar era, when the compatriots of Huemántzin declared their new history begun and founded the second Tula, or, what is more probable, elected their monarch Mixcoamazátzin, as Chavero says. Torquemada gives the same year, but changes the king's name to Totepeuh; and Motolinía varies only by six years, since he says that the present age commenced in 694, while the tables prove that the *Ce técpatl* mentioned by Ixtlilxóchitl could only be 700.¹ So many testimonies give force; it might

¹ Further, the narratives of the history of the Aztecs and their predecessors, the Culhuas (who were Toltecs), which were ordered to be written down by the daughter of Motecuhzoma, Doña Isabel, and which were published by Señor Icazbalceta, coincide in assigning to the first king a year of the eighth century, which is notably near to the year 700. Certainly the princess utilized the services of some truly learned native priest.

indeed be believed, and we have been driven seriously to think that the stone of the museum was made a little after the year 700 A.D., by the hands of a people who, on account of their knowledge in the arts and sciences, have left fame in the traditions as learned and artistic.

For fuller measure! The year 699 was a *13-ácatl*, the date indicated by the tails of the serpents in whose heads and bodies we have read so simply the number 5,096. Whatever chronological tables, those of Veytia, for example, corroborate this assertion. There is nothing venturesome, in the presence of so many and such circumstances in claiming that the monument dates from 1,200 years back and that it was sculptured in record of the most famous assembly of Toltec astronomers, meeting of which this relief seems the imperishable official record. As we think how it has resisted the destructive agencies of the past five hundred years, we hope that it may defy the kiss of one and of many myriads.

There is another circumstance suggesting the Toltec origin of the stone, at least as concerns the ideas represented: the importance which the planet Venus has in the relief. Quetzalcóatl was the symbol of the star; Quetzalcóatl changed himself into Vesper, states the fragment attributed to Olmos, *Hystoire du Mechique*; Quetzalcóatl was the evening star, declares the commentators of Codex Vaticanus A. Ah well, Quetzalcóatl was pre-eminently the product, the most perfect personification of that race. Son of Ixtacmixcóatl, "the serpent of the white clouds" (the Milky Way), tradition says that this personage was one of the brothers engendered by the divine creator, that is to say, one of the original races, called Olmecas, Xicalancas, etc. The Codex Dehesa confirms the legend, since it shows the last beginning their pilgrimage into the heavens. It would not be the first people that has deified its progenitors! Quetzalcóatl is then the representative of the Toltecs, its symbol, its metaphorical incarnation, and the Toltec priests and kings were accustomed to adopt his name. And Quetzalcóatl is also the evening star. Already we have been able to explain to ourselves that they deified him, and that from his movements combined with those of the star of day they made the basis of their chronological system, the basis of their calendar. This being the product of the thirteens and the twenties arranged by cycles of 52 and of 104 years, it obviously results that the adorers of the star are the inventors of the system, the true inventors of the *tonalámatl*. Logical, in truth, that the symbols of the star should figure in a prominent part of the cyclographic stone!

To summarize: Repeat the reading of the characters of basalt, combining scrupulousness with analytical rigor, and always the same data will be found: the four ages of the world, the number 4,992 twice placed (in one of which the numbers 1,664 figures), the number 5,096, the *13-ácatl* correspondent to the same year, the *Ce técpatl*, the following year (5097), and the cycles of 104 and 416 solar years indicated in different modes, the dates mentioned being the result of the addition of these same cycles. Simple and highly logical conception!

Translating this into our language and relating it to modern chronology, aided by documents as authoritative as the *Anales de Cuauhtitlan* and the *Relaciones* of Ixtlilxóchitl, both natives, we may say: The date 5096 corresponds to the year 699 of the Christian Era; this year was a *13-ácatl*, and 1,664 years had passed since 964 B.C. when, in their legends, with discrepancies of about nine years, the natives declared the third era of the world began, assigning to it a duration of four cycles of 416 years. The 32 *itzpapalotl* (obsidian butterflies) of the edge of the relief, each symbolical of a new fire, confirm this assertion. One hundred and four years before the year 4992 of their chronology it is declared that the *quinaméztzin* were destroyed. (Upon the probable origin of these beings, consult Hamy, *Anthropologie du Mexique*; we speak of it also in our *Historia de Puebla*.) The Toltec savants met together then and discussed the creation of the world, the calamities that had occurred, and the movement of the heavens: this means that they proceeded to the regulation of the calendar, basing it upon the observations of the heavenly bodies. Sahagún says that "the Toltecs knew the movement of the heavens and this by the stars." "Clavijero met with data that suggested something analogous, since he declares that the astronomer Huemántzin, governing Ixtlilcuecháhuac, made the sacred book, the *Teoamoxtli*, wherein was explained the movement of the heavens, and assigns to the event a date sufficiently near, the year 660. It is this same date that Boturini fixes for the beginning of what he calls the third age. Both authorities agree in the fundamental fact, but the rigorous and most minute chronology of the *Anales*, recording the dates 674 and 700, is irreproachable; to it we ought to attach ourselves, supported by the double authority of Torquemada and Chayero: that the year 700 was *Ce técpatl* is certain. How not to record permanently the account of that reunion in which had been condensed the wisdom, the legends, and even the auguries and predictions of a race which lived ever scrutinizing

the secret of the firmament! No more fitting means existed than to sculpture it in indestructible material, which should preserve the marvelous secret for following ages.

If the relief of the museum is that commemorative monument, we must admit that its glyphs, so long mysterious, were the work of a master-workman and the conception of a mind which in genius does not yield before Hipparchus, nor Kepler, nor Newton, nor Arago. Thus Bullock was impelled to declare: ". . . . The stone is a conspicuous proof of the perfection to which those races had attained in certain sciences: even in the most enlightened cities of the present day, there are few persons who would be capable of executing such a work."

Slow has been our analysis, and we have succeeded in making the decipherment only step by step, strengthened with the most important codices and confirmed by the most notable monuments, as we shall see later on. But to the eyes of the Mexicans of Tenochtitlan, who placed the relief in a prominent part of their temple, whether they worked it themselves or received it already made, the reading was easy and significant in the extreme. Translating it, so far as is possible, its form would be more or less as follows:

In the year 4992 the third age of the world came to an end; with four more great rounds, four ages. At its termination Tonatiuh and Quetzalcóatl met in the heavens, and in the *tonalámall* it was *Ce cipaclli*, the first of the count. It was the end of the year *13-ácalli*. One hundred and four years later the Toltec savants founded their city and elected a king, and the old men, the astronomers, and the principal diviners having assembled said: We are about to commence again the count of time. And they did so with the commencement of the following year, *Ce técpatl*, which was the 5,097th year from the creation. And they added that this age would have to end through terrestrial calamities, after 4×416 years, since the preceding ages had come to end through the force of water, of air, and of fire, because so the two lords of heaven, who come together every 8 and 104 years, will it. And they decided to record it in a monument, strong and eternal as time, that it should be preserved in the history of the world.

Strange coincidence! Four hundred and sixteen years after the foundation in 1116, the flourishing empire of the Toltecs is destroyed! This is not a date which we arbitrarily suppose: Torquemada, placing the last monarch Achauatzin at that time, and Veytia give the testimony; the learned Orozco y Berra states it; Chavero resolutely accepts it. The *Anales de Cuauhtitlan* vary by just 52 years, which, even if it

were erroneous, gives an indirect confirmation. But the date is not read upon the monument, nor would it be possible to find it there, admitting that it was worked before that event in memory of the meeting of the Toltec astronomers. There arises one question then: if the constructor was that people, how did its monument come to be in the *teocalli* of a Mexican city?

Let us agree first that the people of Tenoch considered itself the heir of the Toltec culture, and that it had accepted it almost in its entirety; on that account it is often compared to the Roman conquerors, conquered themselves in turn by the superiority of Greek culture.

We know that they belonged to one ethnic family, since both spoke Nahuatl. Moreover, a multitude of circumstances exist which permit the affirmation that the Mexicans descended directly from the Toltecs, with whom they had a very close relationship. It would not be strange then that, encountering a monument which in so notable a fashion summarized the wisdom classic for them, they should carefully preserve it and even erect it in their greatest temple. The question of transportation as little involves difficulty, supposing that it was transported from the pyramids or from Tula. Taking into consideration the data of geology, modern archaeologists recognize that the rock mass must have been transported, at least from the mountains of Aculco, the nearest locality where this kind of basalt is to be found. If the Aztecs could transport a monolith of 30 tons' weight from there, they could have done so from a greater distance, for example, from Teotihuacan, sacred city concerning which more and more reasons accumulate for maintaining that it was the Toltec metropolis. The pyramids are not much farther from Mexico than Chalco; and it will be remembered that scarcely two or three decades ago there was brought from there a monument, the one called Omecíhuatl, goddess of water or the moon, almost as large as the relief of the museum.

We come now to another consideration. Ixtlilxóchitl expressly declares against the thesis of various authorities, that the past ages were three and that the Toltecs initiated the fourth in the year *Ce técpatl*. He says that the fourth age "has to finish," a phrase signifying that it was the present one. The sign *técpatl*, placed in the relief to the left, above the face of the sun, eloquently confirms that assertion: it initiates the epoch which the constructors held as contemporaneous. We know from Gama, Boturini, and other authorities

that the initial character of the epoch among the Mexicans was *tochtli*; hence *técpatl* belongs exclusively to the Toltec chronology. There exist presumptions, then, for thinking that the relief condenses the Toltec chronology, reckoning from the chronological reform instituted by that people. Further, remember that in the border of the stone, from whose position it is easy to infer that they refer to past ages, are encountered glyphs corresponding to three ages only, which shows that the face of the monolith is destined to the actual or historic sun, as is reasonable to suppose.

Why then are the ages represented in the figure of the *naolin* four? If the work were that of the Aztecs, the explanation is very simple: the fourth age beginning in the year 700 of the Christian Era, or 5097, of the Indian chronology, the people of Tenoch would consider it ended with the destruction of Tula, reserving to their own history a fifth sun, which is what Gama, Orozco y Berra, Chavero, and other historians believe. Thus would be explained the fact that the numeral situated below the arrow of the *naolin* is a little smaller than the others: it represents the fifth age, not yet terminated; therefore it is smaller. We confess that this reading has offered itself to our mind with singular insistence.

Nevertheless, it does not harmonize with the tetranary preoccupation of the natives; and, above all, it is possible for the four figured ages to be explained within the first hypothesis, that is, that the Toltecs have been the constructors of the stone, or even that the Mexicans did not believe that they lived in another than the fourth age. A paragraph from Veytia will give us suggestive light upon the matter, more especially as he speaks precisely of the meeting of the Tula astronomers. He says:

In the city of Huehuetlapallan, famous and numerous population, there came together not only the learned astrologers who were of that city but others who came from the surrounding populations, who, after conferring together at length over the errors which they had recognized in their computations, determined that the duration of the world ought to be divided into four periods or ages, which had to end by the violence of each one of the four elements. The first age, *Atonatiuh*, from the Creation to the Deluge, which they called the Age of Water, *Atonatiuh*. The second from the Deluge up to the hurricanes in which, by the force of the winds they had suffered the second calamity, and so they called this second age *Ehecatonatiuh*. The third, in which they were, they said had to come to an end by earthquakes, and so they called it *Tlatonatiuh*, sun of the

earth; and after this follows the fourth and last age of the world, which has to end by the violence of fire, and thus they call it *Tletonatiuh*, which is to say sun of fire.

Certain discrepancies with respect to the order of the suns will be noted, which is different in Veytia, in Ixtlilxóchitl, and in the stone; on the other hand, this (the stone) agrees in the said particular with the "anonymous Codex of Gama" or Chimalpopoca. There also appears an error of 104 years (a native century) in the accounts of the Texcocan historian, and other divergencies are not lacking. This is inevitable in treating of so remote events, necessarily vague in their nature. But there is a fundamental accord in the data which cannot be denied; in any event, the relief is the unimpeachable authority to which in the last instance we must attend.

The Toltecs believed, as we have shown, that they lived in the third age of the world, as Boturini and Veytia suppose, or at the beginning of the fourth, as is stated by Ixtlilxóchitl. Their traditions told them that each one of the anterior ages had lasted a definite number of fixed periods of 416 years: the first 1,664—or a bundle more, according to the data of the Texcoco chronicler, apparently in error by 52 years in this account; the second the same length. They found themselves at the end of the third, and held it finished at the expiration of four new cycles of 416 years each. Here indeed Ixtlilxóchitl appears exact, stating definitely the date 4992, which are 12 great periods or 48 Indian centuries. Then occurred the destruction of many of the autochthonous inhabitants of the plateau as the result of a catastrophe (apparently volcanic eruptions) whose last manifestations the Toltecs themselves witnessed; one *huehueticatl* separates this event from the consolidation of the monarchy of Tula.

Clavijero, who places the arrival of the people in the year 596 A.D., indirectly confirms the thesis, since from then to 700 there passed just one native century. Torquemada also speaks of their wandering for 104 years. Chavero admits the same date, 596 A.D., although he refers it to the beginning of the peregrination. Buschmann also states it.

They let these years go by then in consolidating themselves or in wandering; and in the year 597, *Ce tecpatl*, which was 700, they initiated the fourth age of the world. Chavero claims that they then elected their first monarch; Boturini, Gama, and the majority of authorities agree that the Toltec chronology began with *Ce tecpatl*. There are those who place the event at the year 713 and even 719 and

721, an insignificant discrepancy. Motilinia comes much nearer, giving the date 694. M. Remí Simón, very competent in these matters, says that in 690 the Toltecs established the state which was to last more than four centuries, and we read it also in the *Anales de Cuauhtitlan* and in Gómara. The assertion of this chronicler is of particular precision: "Counting from then [the beginning of the historic period among the Indians] until the end of 1552, their sun [age] has 858 years." But it must not be forgotten that, according to the tables, only the year 700 was *Ce técpatl*, and Ixtlilxóchitl has told us that in that *Ce técpatl* the meeting occurred. The illustrious Orozco y Berra, whose scrupulousness in comparison of data and submitting the very last document to rigorous analysis, is proverbial, states precisely the two most important dates 4993 and 5097, a fact that lends irrefragable value to our inferences; thus he himself points out in the *Anales* that of 700 and admits that of 694, giving it for the beginning of the epoch.

They celebrated at its time the famous assembly which left so deep a trace in their traditions, which all the chroniclers mention: there was narrated the history of the world; the calendar was arranged, based upon the cycles of 52 and 104 years, through the interlocking of the thirteens and the twenties (the *tonalámatl*); and it is probable that the astrologers also indicated the end of the era beginning, and which calculations, experience, and the tetrenary concept had naturally to fix in periods of 416 years. All this, finally, was condensed in indestructible characters of basalt.

What strangeness then was there in seeing there stamped the four ages of the world's history although only three had passed? Veytia says, alluding to the Toltecs, that "the future ages will be equal to the past." Therefore their duration appears to be indicated on the relief with the four numerals inclosed in each rectangle, and of which we have not yet treated. Now one conjecture regarding their significance offers itself to us: each one of these represents a great cycle of 416 years and between them all 1,664, exact length of the three periods gone by. It may be said that the stone confirms with mathematical exactness the chronology of Ixtlilxóchitl, followed by Boturini and Veytia; the interpretations of the Codex Vaticanus, imagined by Humboldt and admitted in great part by Chavero and other authors, who give to the native cosmogony about 18,000 years existence for the world, fall to the ground. The basalt, unimpeachable text of the Nahuatl cosmogony, and chronology, proves that Ixtlilxóchitl was very

near the correct; he gives the total number precisely and only exceeds by a single bundle (52 years) in the two first partial figures, indicating 1,716 instead of 1,664.

And indeed, here again a hypothesis which seems probable to us; the Toltecs persuaded that the fourth age was to be the last and that it would have to endure another 4×416 years, judged in accordance with the tetranary philosophy, did not hesitate to carve its symbol on the monolith, assigning to it the duration which they believed foreordained by the lords of the firmament.

In this mode the figures of the relief are reconciled with the supposition that the Toltecs were its constructors.

Nevertheless, there are those who, in the numerals of the rectangles read the names of the days in which the catastrophes occurred. That the ages had their end in those days (*4-océlotl*, *4-ehécatl*, *4-quiáhuatl*, and *4-atl*) in fact is stated in the *Leyenda de los soles*, which is added to the manuscript of the museum, which contains the *Anales de Cuauhtitlan*, and in this codex itself, both declaring that the fifth sun would have to end in the day *4-ollin*. Chavero, and, following his example, many competent contemporary authors (Seler, Joyce, Spinden, etc.) have adopted an analogous point of view.

Were not the said reading supported in so important documents, we should not take the supposition, really almost puerile, into serious consideration. Further, it contradicts the Codex Vaticanus, pictograph which assigns to the catastrophes—and be it noted to three only, which is also done by the Tellerian Codex—very different dates, *10-atl*, for *atemoztli*, *1-océlotl* for *pachatl*, and *9-ollin* for *xilomaniztli*. But the assertion fits so well with the data of the relief, that the hypothesis that this was the work of the Toltecs receives a rude blow. The reading of the four rectangles appears simple: they are the dates when the four first ages ended: as to the *naolin* at the center, with its great numerals, it may be interpreted as the fifth, or Mexican age, which has to end with the day *4-ollin*. In such event, it was inscribed by that people, who then appear the constructors of the monoliths.

The argument is strong, although, as has been seen, Ríos, Boturini, Veytia, and Ixtlilxóchitl do not agree with the *Anales* in the matter. Nevertheless, our museum possesses a most important specimen, which supports our first and logical reading, reinforcing the narrations of the Texcocan writer. It is a stone of cubical form, approximately 0.50 m. on a side, with a border of solar and Venus glyphs

identical with those of the relief. Upon the lateral faces of the cube, the four ages are represented with their respective dots, being identical with the symbols of the chronographic stone or relief of the museum.

The fifth age is met nowhere. We must believe that if the aborigines had conceived a fifth sun, the *Ollintonatiuh*, they would have engraved its figure upon the upper face of the cube: there is no such thing on it. The reality is expressed in the monolith which is called the monolith of Tenanco: four are the ages figured, and the last (here, as in the Codex Fuenleal, is that of water) is not inclosed, as are the others, by means of a band, which demonstrates that they did not consider it as concluded. Also there are seen, joined to each epoch, three great dots and other two smaller that is to say, four larger numerals together: they represent the duration of the four epochs equal in all.

In her most important work (*The Fundamental Principles of Old and New World Civilizations*), Mrs. Nuttall, showing in this an analogous mode of thought, maintains that the Mexicans (not the Toltecs) believed that they lived in the fourth age of the world; Dr. Henning, author of profound studies in these particulars, supposing the beginning to be the sun of air, the *Ehecatonatiuh*, says that at the time of the discovery of America the natives were living precisely in the fourth era—this in his *Study of the Date 4-Ahau*; Charencey suggests a similar idea in the study *Des âges ou soleils après la mythologie*; the same savant has told us that this belief prevailed among the Cakchiquels, and Dr. Brinton makes us know a similar thing with respect to the chronicles of Chilam Balam, that is to say, with respect to the Mayas.

It is possible, therefore, to read in the relief the expression of the cosmogonic ages, admitting that its constructors believed themselves to belong to the fourth. The great *ollin*, with the head of Tonatiuh in the middle, alludes not to a fifth era but only to the movement of the orb between the solstices and the equinoxes, as Gama supposed; and the numerals signify the four *huehuetiliztli* which we have read in them.

MARKS OF THE AZTEC CIVILIZATION

The presence of the four ages represented in the asps of the *naolin* having been explained in a manner sufficiently rational and supported upon respectable historians, the hypothesis that the Toltecs were the authors of the relief remains in the field. And in truth, whoever they may have been, the monument expresses nothing but the history, the

traditions, and the chronology of that so long mysterious race. The so-called Aztec Calendar, which would better be called the Toltec Calendar, is the expression par excellence of the culture of the subjects of Huemántzin, worthy hieroglyph of the people who left to posterity renown of artistic and wise. Here could not be met a higher condensation of beauty and of genius! There is no necessity of a better argument to prove that that race, inventor of the astronomical religion and of the worship of the beautiful twin (Quetzalcóatl), who was in reality but the morning and the evening star, had a real existence and was not a myth as has been suggested. Here is, at last, basis for the first chapter of the uncertain and so many times discussed history of the aboriginal civilizations.

But we have to subject to a rigorous study the possibility certainly not weak, that the Aztecs have been the constructors. Before all, we ought to ask ourselves: Would it be possible that the subjects of Ilhuicamina or of Axayácatl would have worked with exquisite elegance and art a stone which contains the expression of the science and traditions of another people? Although remarkable, the case is not absurd, considering that it treated of the science, traditions, and calendar, fully admitted by the nation, which they considered as the fountain of all their culture. We yet preserve the Greek Zodiac in such wise that an Athenian of the time of Hipparchus, if he were to live again, would be astonished to see in plates and maps the conception of the heavens which his contemporaries had.

But it cannot be believed that the Aztecs would fail to leave some trace, some mark, some date peculiar to themselves in a work of such an extraordinary kind. If investigators do not succeed in discovering something characteristic, some datum definitely Aztec, it will have to be decidedly admitted that, encountered where the monolith was, the Mexi limited themselves to transporting it to Tenochtitlan, erecting it in a site adequate to its merit (and the Aubin Codex, in its first pages, narrates something which might lend support to the conjecture).

We have minutely examined the monument, and we shall honestly say what appears, without claiming certainty, in so difficult a point. That it expresses Toltec ideas and dates is for us indisputable; but it is possible to admit that the Tenochca should have engraved the same fundamental ideas upon a relief, adding some date of their own, and this is what we desire that the reader shall infer from our study, limiting ourselves to presenting the elements of the analysis. The

account of Fray Diego Durán, invoked by Don Alfredo Chavero to demonstrate that this is the monument of Axayácatl, possesses much importance; but it does not command complete confidence, since it may refer to another stone. No one is ignorant of how many confusions have been produced in this direction, insistently calling, for example, a "sacrificial stone" a monument which has nothing of that character, or declaring another to be a "gladiatorial stone" which is totally dissimilar to one. There are reasons for admitting that the relief of the museum was the stone described by the friar; but until now it has not been proved, and we believe that Señor Chavero worked upon a contestable supposition.

Although the date inscribed in the frame corresponds to the date 1479, of the reign of Axayácatl, it corresponds also to the date 699 of the vulgar era, 5096 from the creation of the world in the Toltec chronology; and as we read this last number in the figures that adorn the body of the serpents, and precisely the extreme triangles of the serpents indicate the frame with their tips, it would not be absurd to understand the thought of the artist in this mode: the stone commemorates the year 5096, which was *13-ácatl* in the chronological series. Consulting the tables of the calendar of the Indians it is seen that in fact the year 699 was *13-ácatl*.

Therefore the date with which we deal will not by itself alone decide the problem, since it gives occasion to two apparently legitimate interpretations. But we believe it possible to read, and actually without violence, a frankly Aztec date in the glyphs of the relief. Already we have said how it is met, counting one by one the ciphers stamped on the scales or divisions of the serpents. These divisions are 24; each one inclosing the glyph of fire, its value complete would amount to 52 years; but the half-circle added to each scale indicates that only half is to be taken, that is to say, 26. This gives us 624 years; summing these to the 5,096 before read, we get the number 5,720. The number issues, so to say, from the body of the serpents, added to the actual elements those which their position shows are past. We might attribute their complete value to the scales: they represent in this manner 1,248 years which summed with the 416 of the little bars distributed in the bodies reaches precisely the number 1,664; but this is not the actual date, but the future end of the current age. When the artist engraved the half-circles, it is reasonable to assume that he had a definite purpose: his entire problem consisted in distributing the elements.

We introduce nothing new or arbitrary into the calculation, except considering the scales on divisions of the serpents as indicative each of one *xipoualli*. This does not involve an absurd conjecture. The serpent is time, which grows by fixed periods; each part of its body represents without doubt a new period. What could this be except that symbolized in the tails of the emblematic beings, the cycle of 52 years? The native belief that serpents carry their age marked in this part of their body is well known.

The result has been the number 5,720 of the Indian chronology. Related to our calendar, starting from the year 5097, which we already know was the year 700 of the vulgar era, we find it to be 1323 of the Christian Era. The date not only belongs sharply to the Aztec history, but is in a certain sense the most important in its annals, since it was the date of the founding of Mexico. This the Icazbalceta Codex, commonly known as the Fuenleal, clearly affirms. Very natural that the Tenochca, whether they were of the time of Axayácatl or whatever other monarch, in putting upon the relief their chronological system (admitting the supposition) such as they had received it from the civilizing race, should desire to add to it the record of the foundation of their own metropolis, date memorable for them. If our reading is correct, the monument decides definitely a historic point, which has been bitterly discussed: Tenochtitlan was founded in the year which, with little variation, the Mendoza Codex, Chimalpahin, Clavijero, and the learned Orozco y Berra maintain.

No one is ignorant of how much historical writers have vacillated upon this point. Durán, the illustrious Don José F. Ramírez, and Chavero have decided upon 1318, upon the authority of the *Anales de Cuauhtitlan*; on their part, the *Tira de Tepechpan*, the Aubin and the Vatican codices lend their support to the date 1312, although the two first documents apparently declare the year 1364;¹ the cacique of Tlaxcala, Juan Ventura Zapata, inclined to 1321; Tezozómoc preferred 1326: and Sigüenza y Góngora, Vetancurt, and the Franciscan relations arrive at 1327, although Torquemada fixed 1341 and Enrico Martínez 1357. But the Mendoza Codex, Mendieta, Chimalpahin, Clavijero, and Don Manuel Orozco y Berra incline in favor of the years 1324 or 1325; and the said Codex Fuenleal, most important document, gives exactly 1323. The stone, unimpeachable text, demonstrates that, with very slight difference, these last find themselves in the certainty, at least so far as relates to the official

¹ See our study, *La fundación de Tenochtitlan*.

date, as we might say the year in which they made the celebration of the event. This was the one always recorded in their annals by the Indians, who customarily made them fall upon the termination of a cycle.

Some other Aztec date ought to be found upon the relief. Persecuted and miserable as the Aztecs were at the time of the foundation of their city, the Mexicans were not in condition to work so grand a monument. And if they erected it later, it is clear that they would have desired to mark the date of the work. All peoples proceed in this way in a similar case.

Let us seek this date. Around the cylinder, over the projected part, there are 156 dots in a continuous series, which we may understand as so many other numerals. If we add them to the date 5720, we reach the 5876 of the native calendar. Singular fact! That year is precisely 1479 of our era, in which it is said that the emperor Axayácatl inaugurated a commemorative stone. From 1323, date of the foundation of Mexico, to 1479 precisely 156 years passed, the date of the commemoration being again a 13-ácatl. Is this merely a coincidence? Is the monolith of the museum then the stone of Axayácatl?

According to whether the procedure whereby we have found these last dates appears forced or legitimate, may be repudiated or accepted those which we suggest as Aztec marks; in any event, the dates directly expressed are of the Toltec chronology.

The reader will decide whether the 156 points may be interpreted as has been said. *In any case, the monument expresses the Indian chronological system and cosmogony, the centuries of 104 years and the cycles of 416, the era of 1040 and that of 1664, begun, all these periods, with the character Ce técpatl and ended in 13-ácatl.* Such a reading which is indisputable, suffices to constitute it, in the highest sense, the text par excellence which the aboriginal civilizations have left us. We may add that it is the key of the great monuments, codices, and inscriptions before enigmatical: the Rosetta Stone of Mexican archaeology. It permits the inference that those fundamental concepts, everywhere distributed, were the common property of many primitive families, who received them from one civilizing people, trunk of the cultures anterior to the discovery of America.

Moreover, there is one kind of considerations relative to the date which we have supposed of the Aztecs which we ought not to omit.

It is necessary to exhaust this aspect of the matter, because *the fact that the stone embodies Toltec ideas is not irreconcilable with the fact that Mexicans were its constructors.* We have said that many reasons exist for maintaining that the Mexicans were a later branch from the same trunk as the Toltecs. If we admit that artificers and astronomers of the time of Axayácatl are the constructors of the relief, it would be desirable to ascertain what circumstance might influence their minds to erect the monument at the time claimed. If it were found to be of especial interest, that in itself would strengthen the conjectures of those who incline to this thesis.

Let us recall the tradition that the ages of the world were measured in exact or very approximate terms by series of 416 years. *We do not in any manner, think that the events accommodated themselves to this pre-occupation;* but we believe that the coincidence having been repeated two or three times with sensible approximation by accident, the natives were deeply impressed, and they themselves so arranged matters as to force the principal events of their history to coincide with the end of the sacred cycles. *They undertook peregrinations, founded cities, elected their monarch in special years.* There are many testimonies of this, especially in the annals of the Toltecs, a fact which has brought discords to those who could not explain to themselves, for example, that the kings all ruled for 52 years. It was because the public life was subordinated to the astronomico-religious beliefs. Their predilection for the year *Ce técpatl* was above all manifest: creation of the world, beginning of the Toltec monarchy, exodus from Aztlan, election of Acamapichtli, etc., etc. That people, learned as no other of antiquity, lived dependent upon the movement of the stars, adjusting all their acts to it; tendency, rooted so deeply, that this is really what is read in the stone of the museum: the destiny of the world is developed in periods of 104 and 416 years, directed by the two lords of heaven. Moreover, the tetranary conception ran through the totality of the ideas of the ancient Mexicans, manifesting itself continually, as Mrs. Nuttall's most learned book has demonstrated.

Singular fact, which must have profoundly impressed the imagination of the Mexicans! The Toltecs commencing their era in 5097, year 700 of the vulgar era, one great cycle (416 years) later Tula was destroyed and its inhabitants exterminated or dispersed. The able Clavijero gives to the event the dates of 1052: Brasseur de Bourbourg 1120, placing the death of the queen Xóchitl in 1103; other authors have indicated 1110 or 1070; the *Anales de Cuauhtitlan*

mark one exact Indian century of difference, which is a reason for conjecture; but Chavero, exhausting the chronological analysis, fixes the date: it was in 1116, the year 5513 of the Indians. Here we repeat again that these slight discrepancies manifest the fundamental exactness of the data; at all events, *if the event was hastened or retarded slightly, the aborigines in accordance with their custom, accommodated it in their annals to the great sacred cycles.*

Ah well, the Aztecs themselves had commenced their peregrination about the year 1064 of our era (5460 of their calendar), a fact supported by Gama with data of the native writers Tezozómoc and Chimalpahin; Veytia, too, inclines to that date. There has been much discrepancy between authors with reference to this; but the monolith demonstrates that the date is correct, confirming incidentally the legitimacy of one of the most important documents of our archaeology, the *Tira de la Peregrinación*. In this codex, 183 years are counted from the time of exodus from Aztlan until the making of the new fire at the station of Chapultepec. The same appears in the *Anaglifo* or Codex Aubin, this precise accord between pieces completely independent corroborating the exactness of the date. The date named (that of the new fire kindled at Chapultepec) has been determined by Don Alfredo Chavero: the event took place about 1247; the beginning of the journey, 183 years earlier, was consequently in 1064, *Ce técpatl*. Well, from then to 1479 there passed just 416 years, if we include the one that served as starting-point. There results one grand cycle completed between the two events.

What stronger reason for the commemoration than that one of those grand periods at the end of which the natives awaited the destruction of the world had happily ended? It may be assumed that the stone was prepared in good season before so solemn a festival. A suggestive incident supports this supposition: according to Durán's account, the relief completed on the date inscribed in the tablet was not inaugurated until one or two years later. It is easy to think that Axayácatl would await the fulfilment of the prophecies, and until priests and people were convinced that no calamity occurred, when they resolved to celebrate the festival—the greatest that their annals record—in which they sacrificed an enormous number of victims as thank-offering to the gods who prolonged their existence.

There exists another date which seems interesting to us. The Tellerian-Remense Codex as well as the Vatican Codex 3738 have the year 1479 marked by a highly conventionalized arboreal design, which

the commentators do not study and which we believe has not been interpreted. What can be the meaning of this elaborate tree located precisely with this date? Trees are usually the representation of cycles and grand periods, as may be seen in the Palenque tablet and in a multitude of codices. Perhaps it is then the symbol of the *cozcaxiuhuitl*, the sacred cycle which had just then concluded. We will add that the *Tira de Tepechpan* has with the same year divisions which seem to mark the end and beginning of counts.

Lastly, omitting altogether any transcendental allusion, cosmogonic, mythical, or cyclical, the little bars of the body of the serpents, which terminate in the date of the tablet, give this most simple and perhaps incontrovertible reading: *from the beginning of our history until the present year (13-ácatl) have passed 416 years.*

In résumé, if the monolith was finished in 1479 as is inferred from the text of Durán, there can be no doubt as to the motive that inspired the work. We insist upon the fact that the stone agrees with the precious *Tira del Museo*, proving unimpeachably its authenticity. The race of Tenoch did not begin its march either in 648, or 820, or 902, or 1116, or 1160, or 1168, or in 1194, as Buelna, Durán, the Ramírez Codex, Clavijero, Humboldt, the Vatican Codex, Chavero, García Cubas, and other authorities say; but in the year 1064. The learned Gama and Veytia are right; the notices of Chimalpahin are good. This writer declares that the first ceremony of the new fire was celebrated by the Aztecs at Acahuatzinco in 1091 and that 27 years before they had started from Aztlan, which would be 1064. The *Tira del Museo* places the beginning of the march in *Ce técpatl*, 27 years before the first new fire. The Codex Aubin, on its part, affirms that in 1507 the Aztecs completed the eighth century of their annals, kindling the new fire: and, in fact, from 1091 to 1507 there are eight periods of 52 years, which was the sacred cycle of the Indians. This document also places the exodus 27 years before the first new fire.

The relief and the *Tira del Museo* then fix with apparent definiteness one of the most disputed and important dates of the history of ancient Mexico.¹ The Aztecs, in boats, sallied from a place which we will call Aztlan, Culhuacan, or what you please, in the year of 1064 of the Christian Era wandering for the space of 260 years, significant cycle, until founding the metropolis of what was later a proud empire. And this is a new proof that the city of Tenochtitlan was founded in 1323, since it is already known how the natives adjusted the capital

¹ See our study *La fundación de Tenochtitlan*.

events of their collective existence to the sacred periods; from which the tradition that they ever carried with them the sacred book, the *Teoamoxtli*, on their journeyings. The *Teoamoxtli* was the book of chronological reckoning, it was the *tonalámatl*, it was in fine the calendar. Perhaps they found the cactus (*nochtlí*) a little earlier, in 1312; but they waited until the cycle should end before celebrating the event, giving the foundation as inaugurated.

It is not difficult to imagine now how events occurred. Four hundred and sixteen years had been completed since the adventurous tribe issued by water from a place the situation of which has not been convincingly determined, and that date finds them prosperous and increased as they never had anticipated. The year had passed by without a mishap. Nothing strange then that they should desire to solemnize the fact, fixing it indelibly in an enduring monument. In such case, this ought to bear the date 1479, this is to say, 13-ácatl and 5,876 numerals. We see them there in fact:

$$5,096 + 624 + 156 = 5876.^1$$

But there was another date which they awaited with misgiving. Counting from the creation of the world, or simply from the beginning of the Toltec era, from the year 5097 of their chronology, the destruction of Tula marks the end of a period of 416 years. Starting from this catastrophe, the new grand period had to finish in 5929, that is to say, in 1532 A.D. The subjects of Axayácatl found themselves in the year 5877 of their chronology: exactly one tying, one *xiuhmolpia*, was lacking for the feared date. Thirteen years before its completion, in 1519 of the vulgar era, after desolating the coasts of Yucatan and Tabasco, a group of fierce and resolute adventurers disembarked near Sacrificios, who left a trail of blood and slaughter behind them. They came from the Orient, from the direction from which a mythical personage of their traditions, Ce Acatl, had prophesied his own return, in a year of his own name, to conquer the earth and take possession of it; to re-establish, in fine, his ancient kingdom. And the year in which such an extraordinary event took place was precisely the year *Ce ácatl* (1519).

¹ And at the same time it ought to mark the beginning of their historic existence, commencing with the Toltecs, as is plainly evident in the three relations made by Doña Isabel Motecuhzoma, where the Toltec and Tenochca kings form one continuous series. And there appears the cipher $1,479 - 624 - 156 = 699$, that is to say, 700, the initial year being counted. Or according to the Indian chronology (13-ácall) $5,876 - 624 - 156 = 5,096$ (*Ce técpatl*).

Would it be strange that Montezuma, great astronomer and priest, should see in these signs the clear fulfilment of prophecies and have a presentiment of the catastrophe destructive of his nation and his people? Could the Aztecs feel any confidence in an armed resistance against the inexorable fate decreed by their own deities? No, certainly, and they fought without hope of victory: for this, their last monarch proudly bore the name of "The Eagle who Falls." Last representatives of an indomitable race, they truly desired to end with the dignity which corresponded to their past glory; and in the siege of Tenochtitlan, disheartened but stubborn, not weakening before the crushing weight of numbers, nor before famine, pestilence, and the cruel attacks of the enemies, nor before desertion and treason of compatriot races, nor before the fires of earth and the lightnings of heaven let loose upon them, they gave to the world an example of heroism greater than histories can record. If the ancient Mexicans had not been persuaded that their ruin was a thing determined from above, the phalanx of Cortez, in spite of its undaunted courage, would have been undone at the first vigorous assaults of the warriors of Cuauhtémoc!

COMPARATIVE ARCHAEOLOGICAL DISCUSSION

Let us proceed to pass in review the more important opinions formulated, in way of interpretation, with regard to the monolith of the museum; let us mention at the same time the monuments and the codices which confirm our views, citing some of those which the stone itself now permits to be understood easily, since once the key is discovered it appears to lift the veil which concealed the enigma of our antiquities. We shall add the filiation of ideas which carried us to the discovery, in order that its origins shall be exactly known, indicating the development of the conception.

Here is the enumeration of the glyphs of the relief:

- 1st circle—(a) Face of the sun, with distinctive signs.
- 2d circle—(b) Great numerals of the following circle.
 - (c) Squares or rectangles of the same circle.
 - (d) Dates and signs of this zone.
- 3d circle—(e) Aztec month.
- 4th circle—(f) Groups of fives.
- 5th circle—(g) Solar glyphs.
- 6th circle—(h) Pentagons or trapezoidal figures.
 - (i) Rays and asps.

7th circle—(j) Flames or feathers from the inner border of the serpent bodies.

(k) Groups of four little bars in the body of the serpents.

(l) The serpents themselves, with their parts; scales or divisions of the body; numeral dots and tyings of the tails.

(m) Date inscribed in rectangular frame.

Margin of the relief. (n) Glyphs—*tēcpatl* and *iztpapātol*—of the projection of the relief.

(o) Numerals distributed in various parts of the relief.

7th circle—(p) Heads of the serpents with the plumage decoration.

These glyphs may be grouped as follows:

I. Dates of the relief. Letters *b, d, k, l, m, n.*

II. Solar glyphs. Letters *a, g.*

III. Cycles. Letters *a, b, c, f, g, h, k, p.*

IV. Division of the day. Letter *i.*

V. Ages of the Indian cosmogony. Letter *c.*

a) All have seen the image of the sun in this central face. It is Tonatiuh or Xiuhtecuhtli ("Lord of the Day") under the especial form of the Huehueteotl. It is an old sun, a *huehuetiliztli*, which represents the entire Indian century. The sign which adorns the forehead constitutes one of the enigmas of the monument and has given rise to the most divergent opinions: among others that it is the phonetic of the word Mexico, an unsustainable supposition. Its importance is, beyond doubt, capital. It has been claimed that the two numerals that accompany it express *Ome ácatl*, symbol of the correction of the calendar. No thesis is apparently more substantial, more interesting, more plausible. There is none which we ourselves would more desire to see fully confirmed. If established, it would corroborate the hypothesis that the monolith was Aztec work, since the transfer of the initial of the year from *Ce tochtli* to *Ome ácatl*, which is the essence of the correction, was realized in the year 1091 (as Chimalpahin and Gama claim), or in 1143 (which is what Orozco y Berra says), or in 1455 (according to the assertion of Don Alfredo Chavero); under all three suppositions it was the work of the Mexicans. If then the stone of the museum bears inscribed upon the most visible portion of the relief, the sign of this most important operation, there is no doubt that the monument belongs completely to Mexican civilization.

Also it has been claimed that *Ome ácatl* was a second name for the sun, the reason why many of his representations show that sign.

Gama states that *Ome ácatl* was a deity and a particularly propitious sign, for which reason they placed his sign anywhere possible.

But it is a fact that, the more carefully it is examined, the sign in question is not a cane. Chavero himself came to that conclusion, and radically changing his view, claimed that the sign was *técpatl* and that it referred to Mars, planet symbolized in the central face; a thesis in all points arbitrary. (See the work *Dioses astronómicos de los antiguos Mexicanos*.) Neither does the glyph have anything of *técpatl* nor does it symbolize Mars, but the star Venus; nor can the image at the center of the stone, with the splendid rays which surround it, be confounded with anything except the radiant face of Tonatiuh.

Incapable of categorically undoing the difficulty, we will only venture a conjecture: the glyph considered is that distinctive of the orb itself, since it also appears on the forehead of the solar snake of the same relief. The numerals might indicate that the chronological value of the face ought to be taken twice in some computation. What might this be? The central zone of the relief, circumscribed by the serpents, by its position on the face of the monument easily denotes the present epoch, or the historic sun. In this, of course, there should continue, as in the previous ones, 1664 years. The elements of the circles which compose it (and this is explained by the repetition, at first sight without object) actually give the number:

| | |
|--|-------------|
| Circle of the glyphs of Quetzalcóatl or pentagons.... | 416 years |
| Circle of the solar glyphs..... | 104 years |
| Circle of the groups of fives, 260 Venus years or..... | 416 years |
| Four great numbers affecting the face..... | 416 years |
| Two numerals upon the forehead of the <i>huehueteotl</i> ... | 208 years |
| The very face of Huehueteotl..... | 104 years |
| Total..... | 1,664 years |

c) Of the cosmogonic ages figured in the four rectangles, we know nothing to add to the masterly study of Don Alfredo Chavero; but we understand him to have erred as to their duration, determined by the very numerals inscribed in the rectangles. The illustrious archaeologist did not restrict his attention to them, preferring to resort to the chronology of the Vatican Codex, not entirely happy in our judgment. We have elsewhere stated that each dot represents 416 years, and the four 1,664, datum confirmed in Ixtlilóchitl and by the

stone itself (Abadiano erroneously attributed 104 years to the dots, which would give 1,664 to the combined rectangles, or of the four epochs, supposition which does not agree with the testimonies of the codices and particularly not with those of the Texcocan historian). According to this cosmogony, the world should have concluded 6,656 years from the creation. Each age reached 4 cycles of 416 years. (Ixtlilxóchitl adds one bundle of years to the first epochs: and secondary catastrophes were accustomed to happen in the intermediate cycles.)

The monolith of Tenanco expresses analogous ideas: each age is accompanied by three large dots and two little ones, and there are bands inclosing them which below are conventionalized into knots, except the last epoch, which shows that it was not considered as closed. The cubical stone of the museum, to which we have already referred, upon whose lateral faces appear the emblems of *Ehecatonatiuh*, *Tletonatiuh*, *Atonatiuh*, and *Tlaltonatiuh*, with the four numerals corresponding, carries a border formed of solar and Venus glyphs identical with those of the relief, new proof that time was counted by the interlocking of the two celestial bodies. Neither the upper nor the lower face bear inscription or any design. It may be inferred that there was no fifth age, a thesis incompatible with the fundamental tetranary conception the Mexicans considered themselves within the epoch initiated by the Toltecs.

In his seventh *Relación*, published by M. Remí Siméon (Paris, 1889), written about 1629, Chimalpahin affirms that then they found themselves in the year 6471 of the world, that is to say, within the fourth age, which was not yet terminated; less would it have been terminated at the time of the working of the monolith.

There is a fact that deserves to be noted. The Codex Fuenleal narrates the history of the world, with the description of the four successive suns. It declares the first to have been controlled by Tezcatlipoca; the second by Quetzalcóatl; the following was presided over by Tlaloc; and the fourth and last of the suns remained under the influence of the goddess Chalchiuhlicue, divinity of water. Ah well, the tiger (*océlotl*), figured in the upper rectangle of the left of the solar face, joined to a great *técpatl* beginning of the chronology, presents in the ear, according to certain authors, the *mamalhuaztli*, and according to the opinion of others, the distinctive attribute of Tezcatlipoca; the mask of the rectangle to the right is the well-known mask of Ehécatl, second name of the god of the air, Quetzalcóatl; in the inferior rec-

tangle of this same side, a face is believed to have been recognized similar to that of Tlaloc; and the last of the rectangles shows vaguely the outline of a female face, which might be that of the goddess "of the emerald skirt." This coincidence is very curious. The same order of the ages is encountered in the document called "Anonimo de Gama" or "Chimalpopoca"; in accordance with the stone, Tlaltonatiuh is the first. The data of the Codex Fuenleal differ indeed from those of the relief as to the duration of the epochs: the document assigns to them respectively 676, 676, 364, and 312 years, or 2,028 in all; this agrees neither with the tetrenary concept nor with the figures of Ixtlilxóchitl.

As to the figure of the *naolin*, the arc of a circle which it embraces represents very well the amplitude of the movement of the sun toward both sides of the line of the equinoxes; a savant so illustrious as Sir Norman Lockyer has declared that "the symbol figures correctly and appropriately the annual course of the sun" (citation of Mrs. Nuttall).

b) We have said how we interpret the four great numerals of the following zone, distinct in size and details from the fifth one placed below the *naolin*. They affect the central image, clearly expressing 4 *huehueticatl* or Indian centuries. There are those who see in them and the numeral below the five *nemoteni*, mistaken assumption which does not fit well with the etymological meaning ("superfluous, extra, useless days"). In fact, these are encountered, almost concealed, to the number of four, under the claws of the snakes, in accordance with the deprecatory and superstitious idea which the Mexicans attributed to them.

d) Concerning the dates inscribed in this zone we have no contingent to bring. The thesis of Gama may be admitted with respect to those whose general interpretation of the monument, we may say in passing, is the only one among all those that have been offered that maintains a respectable footing. Our reading of the stone is not unreconcilable with the thesis that the relief might serve in the manner of a sundial, vertically placed, with the face toward the south, and that the shadows of some gnomons have indicated the hours of the day and the time of the spring equinox and the summer solstice. For the great archaeologist these two dates are the *Ce quiáhuitl* and *Ome ozomatli*, which are seen below the *naolin* (although in truth, we do not read *Ome*, two but *Chicome*, seven, *ozomatli*). The fact is easy to prove by calculation, or experimentally by constructing a model in plaster, arranging it in the form indicated by Gama and observing the shadows on the corresponding days March 21 and June 21). Chavero

believes another thing: that the dates indicate the days on which the sun passes by the zenith of the city (May 17 and June 26), which is possible and can be tested by experiment; but it cannot be fitted with the theory that the stone had to be placed horizontally. Various modern interpreters of the stone have fallen into this error; adopting in general the explanation of the dates proposed by Gama, they claim that the stone had to be laid down, as Chavero affirms; without observing that the theory of the first archaeologist requires the vertical position of the monolith. Only so can the shadows be produced.

Concerning the symbol *Ce técpatl*, placed in a prominent part, near to the face of the sun, we know that it represents the beginning of the chronology, beginning of the creation, and the first day of the fourth age of the world, which was the present one for the constructor race (Toltec or Aztec). For such a reason it bears the *mamalhuaztli*, glyph of the new fire. The count begun with this character necessarily concludes in *13-ácatl*, the date inscribed in the frame at the top of the monolith, at the end of 52, 104, 416, and 624, 1,040 or 1,664 years. And all these cycles are read in the stone, but especially that of 416. The nature of the system determines this result, in which may be seen the capital idea of the relief, although omitting the reading of dates alluding to concrete incidents; the present age, begun in *Ce técpatl* (for this reason the *copilli*, royal symbol, accompanies the character—idea of Señor del Paso y Troncoso communicated to Señor Batres, although this archaeologist believed that the symbol ruled only one *tlalpilli*) will end on the day *13-ácatl*, upon the completion of the development of the serpent of time.

We repeat that in this may be seen the culminating reading of the relief, and the conception harmonizes perfectly with what we know of the cosmogony and chronology of the Toltecs, with so much the more reason as the initial character of the computations of the Aztecs was *tochtli*, and not *técpatl*. The thesis that the monument expresses the ideas and history of that people possesses without doubt extreme substantiality. Nevertheless, it is not absurd to admit that 780 years, of the present historic epoch, the fourth in any case, had passed at the moment of working the stone, 624 of the scales affected by the half-circles, until the founding of Tenochtitlan, in the year *13-ácatl* (1323), and 156 more which we take from the dots of the edge or cylindrical projection. With these there is reached the year 1479 (*13-ácatl* also) of Axayácatl. Because we must agree that the half-circles and the dots were placed with some object, such a mode of

thought involves the indirect confirmation that, for whatever reason, the system was considered as established from the beginning of the year 700 of the vulgar era—so prominent in the chronicles—probable beginning of the fourth age of the world in the beliefs of the natives; and reveals that the Mexicans, descendants of the Toltecs, adopted completely the culture of the people of Huemántzin, reproducing its fundamental ideas. Speaking of the *Ehecatontiuh*, fourth age of the world in his conception, Henning has said that it “is an event, if not absolutely, at least relatively, modern” (*Study of the Date 4-Ahau*).

It has been fancied that there are traces of the face of Tláloc in the figure of *técpatl* in the relief: it is certain that what the sign carries is the *mamalhuaztli*, or the attribute of Tezcatlipoca; it might indicate that the first of the epochs was presided over by this deity, as the Codex Fuenleal affirms; then *Ehecatonatiuh* would be the historic sun, it being conceived that some have seen in the central face that of Quetzalcóatl, idea truly vigorous. The glyph has at the left its guardian,¹ Tletl, symbol of fire, and the *copilli* of the kings.

There are not lacking some who think that this figure phonetically expresses the name of Motecuhzoma or that of Chimalpopoca. The *copilli* also denotes the creative goddess. Sometimes we think that it is the name of the artificer or astronomer maker; or indeed of *Cipactli*, the first light and the first day, breaking from the divine throne and from the *tlachco* (ball ground) of heaven; also it might be presumed that the character *Ce técpatl*, year in which Acamapichtli, the first monarch of Mexico, was elected, joined with the royal *copilli*, alludes to the beginning of the Tenochco monarchy; but there would be much to object to, and we strongly prefer to see in the figure the sign of royalty, that is to say, of that which is now in force, with the guardian of the first day: the idea of Señor Troncoso.

There is one fact deserving notice. Conformably with the data of the Codex Borbonico we know that the *quecholli* or guardian of the year *Ce ácatl* is Tepeyóllotl. Ah well, the year 1519 of the vulgar era, when the Spaniards arrived at our country, was precisely *Ce ácatl*. Counting back in the tables, in accordance with the order of the guardians indicated in the codex, it is found that the first day of the year 700 corresponds to the character Tletl. New proof of our reading of the stone.

¹ The author uses the word *acompañado*: it might be translated “companion,” “guardian”; it is usually given in English as “lord of the night”—there being nine “lords of the night,” *acompañados* or *quecholli*.

Gama states that in the day *Ce técpatl* the Indians celebrated one of their principal festivals, consecrating it to the flint knife (*técpatl*) itself, deified under the name *Teotécpatl*, this being joined with the festival of fire. This is not opposed to our reading of the monolith, we have said that a part of the hypothesis of the savant remains intact.

We do not believe it inopportune to reproduce here some paragraphs from our study *De Sahagún a Del Paso y Troncoso*, which condenses the principal ideas of the interpretation of Gama:

So far as concerns the figures which immediately surround the face of the sun, he interprets them as the *nahui ollin*, or the four movements of the orb between the solstices and the equinoxes (as well as of its two passages through the zenith of the city); the figures themselves indicating the dates of the Aztec year in which the phenomena occur (*Ce quiáhuatl*, *Ome ozomalli*, *Nahui océlotl*, and *Nahui quiáhuatl*); and particularly the symbols inclosed in the four rectangles he interprets as the four cosmogonic ages or periods in the life of the human species. The monolith gives these indications of the movements of the orb, the year *13-ácatl*, engraved in the quadrangle at the top of the stone, because this year falls at about the middle of the Aztec cycle of 52 years, when "there takes place with sufficient approximation the arrival of the sun at its equinoctial, at the solstitial points, and at the vertex or zenith of the city, the twice in the year when it passes that point, on the dates which are indicated upon the stone, and consequently the time fixed for celebrating their festivities." In order that such a result should be secured, the stone must be supposed placed vertically upon a horizontal plane (as now it is found) and with the sculptured surface looking toward the south; moreover, exactly directed from east to west. In this position the monolith registered the movements of the sun during a portion of the year, or be it in the period during which the orb advances from the equinoctial to one of the tropics, which assumes that there was another similar stone (Gama believed it buried) in which should be figured the dates of the remaining festivals, comprised during the space of time which the sun tarried in coursing through the other part of the ecliptic. At the same time the savant believed that the stone was a solar timepiece, which by means of gnomons indicated the hours of the day, some threads stretched between these gnomons serving to indicate the days of the solstices and the equinoxes, since at the time of the latter the shadows would be parallel and at the summer solstice they would be confounded, while at the winter solstice the shadow of the upper thread would fall above the stone or in the line where the vertical plane of the monument cut the ground. These gnomons were placed in the eight sockets, which, in fact, appear near the border of the cylinder.

Although differing in some points, our interpretation of the relief is not in complete disaccord with the ideas of the illustrious archaeologist since it is possible to admit that the stone has been as he says, and that the gnomons would give something of the indications that he mentions; it is possible to admit that the *Ce técpatl* indicates one of the festivals, as well as the first day of the fourth age, the figure near being the *acompañado* of this day. We differ indeed as to the meaning of the *13-ácatl*, which does not fall toward the middle but at the end of the cycle (except when this begins with *Ce tochtli*, conformably to the Mexican system, which date is not seen on the stone, which bears the Toltec *técpatl*); we differ at the same time in some other particulars, as the reader will see.

f) The following zone is the one from which we begin to proceed through the field of conjecture, according to the phrase of Don Antonio Peñafiel. It is the circle of the quinaries or numerals distributed in groups of five units. There are in all 260 units of this kind, perfectly counted, but not explained until now.

Chavero and the majority of archaeologists see in these the *tonalámatl*, sacred reckoning which really consists of just this number of days. But it must not be forgotten that it is distributed in thirteens, and in the zone which we study the thought of making the distribution in groups of five units appears very clear.

In reality it treats of Venus years. The explanation is moreover simple. The period of the planet measures eight solar years, equivalent to five in the Venus calendar, phenomenon unquestionably observed by the natives, as the festival *atamalqualiztli* proves. In other terms, five synodical movements of Venus, each one of which lasted very near to 584 days, is equivalent to eight years in the solar calendar, knowledge which the aborigines could acquire by observing the march of the planet. This was the origin of the festival which was celebrated every eight years. According to this, the fives represent the five revolutions of the planet which make a set with the solar calendar; to which we add the following: Only five of the twenty-day characters or symbols of the native month were initials of the year in the Venus calendar. The selection then of the groups of five seems perfectly motived. And as the numerals distributed in this form are 260, the indication is of that number of synodical movements of the evening star, that is to say, it treats of 260 Venus years. The number, which also constitutes the basis of the *tonalámatl*, was sacred, and the period, especially significant, is found in

harmony with the other elements of the relief; 260 Venus years adjust themselves to a grand cycle of 416 solar years and equal exactly 584 *tonalámatl*.

Another proof that these elements do not allude to days, but to years, we shall see in the two objects, which are considered in the next paragraph, in which fives appear combined with glyphs denoting the solar years; it would not be logical to suppose that elements signifying a day should be arbitrarily mixed up with elements signifying a year. This is the error into which have invariably fallen Chavero, Valentini, Abadiano, and most of the interpreters of the monument.

g) Glyphs follow which have been counted by Chavero and other authors; but, except for that archaeologist, who saw in them a cycle of 104 years, without decipherment. They represent solar years, and they are seen combined with the preceding in many astronomical monuments of the museum; in the cubical stone with the four ages of the world of which we have spoken before; in the stone known as the Stone of Tizoc, on whose border Abadiano read the same number of 1,664 which we know represents one of the ages of the world; in a most interesting stone box (*tepetylacalli*) from Texcoco, which also belongs to the museum, etc., etc.

The finding of the two classes of units in the cubical stone sufficiently proves that they denote years, since it is not logical to compute in another manner ages of prolonged duration.

The same glyphs, in diverse combinations, appear in a great number of monuments: pages of the codices; a precious vase (*cuauhxicalli*) in Berlin of which Kingsborough published an engraving; the admirable stone of Tepetzuntla, symbolism of Quetzalcóatl, which shows under the teeth the 8 glyphs of the solar years equivalent to the five Venus years which the god has on the forehead; the frieze of Mitla, copied by the great German archaeologist Seler; the figure from a Tacubaya garden which is called *Tetzcatzóncaatl*.

h) No one has deciphered the so-called "pentagons." We identify these glyphs with the conventionalized signs, sufficiently analogous, which adorn the body of the so-called *Cipactli* of Xochicalco and that of the four serpents of page 72 of the Borgian Codex. Four plumed serpents appear in the codex, with 13 circles distributed over the body (including the eye of the monster). The figure forms a sort of frame within which the initial characters of the Venus year are encountered. We already know that there are five of these. The circles

indicate that the combination is separated 13 times in one *huehue-tiliztli*. Each one of the fantastic beings has then the value of 65 Venus or 104 solar years.

Seen with attention, the glyphs of the *Cipactli* of Xochicalco have no small similarity with the pentagons. It has been said (Rámon Mena) that their outline is that of a snail, relating them to Quetzalcóatl; this is correct, since it concerns a conventionalization of the jewel of that deity which alludes to his marine origin (the deity proceeded from the sea of the east). The giant *strombus* is truly the most beautiful shell of the Antillean seas and of the Gulf; its hollow interior reproduces the murmur of sea waves; for this reason they adopted it as the emblem of the deity come from that direction. Sahagún, describing the representations the Indians made of him, twice mentions the shells that served him as adornment: "He has a collar of gold, from which hang some very precious sea shells some leggings of tiger skin, from the knees down, from which hung some sea shells."

In the pentagons of the relief there is very evident a curve or hollow in the lower part, which in the figures of Xochicalco very clearly presents the outline of an ear or shell. Both characters contain the same symbolism: they are Venus symbols each of which represents 2,920 days, equivalent to eight years. Assuming the planet to be morning star at the beginning, this period having run its course, it will occupy the identical position in the heavens. Ah well, the *Cipacili* of Xochicalco have thirteen signs, like the groups of pentagons of the relief. Each one, therefore, denotes 65 and the four groups 260 Venus years, which are 416 solar years. The stone, the codex, and the edifice say the same thing. The groups of pentagons might be replaced around the face of the relief by the four serpents of the codex or by the *Cipactli* of Xochicalco.

The initial page of the Fejervary-Mayer Codex, the page of the cruciform trees of the Vatican Codex B, and others of the most notable pictographic representations are to be read in the same way, as we shall demonstrate further on.

We insist that the pentagons of the stone allude to Venus cycles and not at all to days. Abadiano sees in them the groups of twelve and thirteen intercalary days, which the natives, according to the theory of Gama and Orozco y Berra, added at the end of each 104 years to adjust the calendar with the tropical year. But, apart from the fact that the codices bring no conclusive proofs of such correction,

as Seler has shown, we will repeat that the elements of this central part of the magnificent relief are glyphs symbolical of special cycles and of complete years; but in no case of days. These find their representation by means of dots upon the bodies of the serpents and with their own proper characters in the zone outside the sun's face; the other characters of the central part of the stone possess a much larger significance, in consonance with the importance of the monument. The objects of this kind that deal with the representation of a simple year are very few; usually the natives figured knottings or tyings and the cycle of 52 years, which appears with great frequency in the codices and in the inscriptions of stone. It happens thus in the tableland of Mexico the same as in Yucatan; in Mitla and Xochicalco as in the zone of Palenque, Copan, and Quirigua. With greater reason may we suppose analogous meaning in a colossal relief, which is but the *Teoamoxtli* made stone or the allegory of the world's history, conformable to the cosmogonic and astronomical beliefs of the aborigines. It is obvious that, in an allegory of this kind, the component elements shou'd represent periods o' a certain duration.

Let us undertake now to explain rationally the necessity of inscribing four groups of Venus cycles in place of one, since one suffices to indicate the century of the chronological counts, 104 years. We might limit ourselves exclusively to facts, indicating the pages already mentioned of the Borgian, Vatican B, and Fejervary-Mayer codices, which show the frequency with which the native astronomers repeated in their pictographs what we see in the basalt relief. Also the Dresden Codex gives the number of 151,840 days, which are 260 Venus years. But we must explain the data which are observed. The reason of the fact reveals how perfect were the astronomical observations of the ancient inhabitants of America, and to what height their knowledge of the phenomena of space attained. The value of the apparent revolution of Venus not being exactly 584 days, but 583 days 22 hours, 6 minutes, and 14 seconds, it seems that the natives knew this difference, at least as regards the 22 hours over and even a little more. In the development of the series of days, it results that at the end of 104 years (65 Venus years) the calendar of the planet was five days behind with reference to the solar; and the Indians, proceeding as astronomers, had to make some correction. This was secured by initiating in a special calendar (probably reserved for chiefs and priests, and but little known to the vulgar) the second *huehuetiliztli*, with another five of the twenty day

characters, and making them run thirteen times, as the preceding, until terminating a new sacred cycle. This concluded, they continued the falling behind with other five days, making use of the third group of characters; and, finally, at the closing of the fourth cycle of 104 solar years, theoretically have entered into the arrangement, as initial years, all of the twenty day characters of the month, permitting that the new period of 416 years should commence anew with *Cipactli*. The idea, for which there exist no conclusive proofs, has been very ingeniously suggested by Mrs. Nuttall. Each time that the long-drawn-out period arrived at its end, the calendars of the two stars actually adjusted themselves, at the time when they returned to concur in the same respective position in the firmament. The harmony and beauty of this arrangement are indeed marvelous.

The distribution of the day signs in the planet's calendar results as follows:

First *huehuertiliztli*: Cipactli, Cóatl, Atl, Acatl, and Ollin

Second *huehuertiliztli*: Miquitzli, Itzcuintli, Océlotl, Técpatl, and Ehécatl

Third *huehuertiliztli*: Ozomatli, Cuáuhltli, Quiáhuitl, Calli, and Mázatl

Fourth *huehuertiliztli*: Cozcacuáuhltli, Xóchitl, Cuetzpallin, Tochtli, and Malinalli

The great cycle ended in *Malinalli*, to begin with *Cipactli* in the one and the other calendar. We shall see this confirmed in the edifice of Xochicalco, where *Malinalli* separates the allegorical representatives of 416 years; let us say for the moment that these groups of day symbols are those which are met with in the four serpents of page 72 of the Borgian Codex. Their true significance has eluded the archaeologists until now. Seler limits himself to see in the page mentioned the four parts of the *tonalámatl*.¹ This would not explain satisfactorily why the monsters have thirteen divisions in the body; by our hypothesis, the thing is simple; they are the number of times which the five chronographic signs run in one *huehuertiliztli*. In total, 52 occasions: the number of the pentagons of the monolith.

At the same time, the number 151,840 (number of days in 416 solar years) has the notable property, not yet observed so far as we know, of being a multiple, with the difference of a single unit, of the

¹ Although the same savant ventures the hypothesis that this page expresses some great period of time. And Don José Fernando Ramírez affirms literally, studying the Borgian Codex, that "the Mexicans had a cyclical period much larger and more perfect than Gama concedes to them, and all the other writers who have followed in his steps" (the period of 104 years).—Letter to Andrade, July, 1850.

number 9; the characters of the *tonalámatl* known as the *quecholli* or *acompañados de la noche* close in that period a complete round, since in the last day there are superposed two characters in accordance with the invariable practice of the arrangers of that book. The same result is not secured at the end of 104 years, because in 37,960 days seven *quecholli* remain, it being necessary that this cycle repeat itself four times in order that the important and mysterious nocturnal characters should combine with the diurnal in a harmonious manner. And this is a new confirmation of the special importance which the Indians attributed to the great period; in it, all the chronological elements combined:

$$151,840 \div 9 = 16,871 + 1$$

$$151,840 \div 13 = 11,680$$

$$151,840 \div 20 = 7,592$$

Now we may understand why the cycle of 416 years is found repeatedly stamped upon the relief. Although the movements of the sun and Venus are adjusted every 104 years, that is to say, the planet finds itself then in the same relative position to the principal star (for example, at the beginning of its heliacal rising as the morning or in the first day of its apparition as evening star); on the other hand, the calendars of the one and the other celestial body are not rigorously equal, just as also they are equal each eight years; it being necessary that 416 (260 Venus) years shall pass for initiating themselves with *Cipactli* on the same day and with the numeral 1, the two bodies occupying the same relative position as they had before in the firmament. This is the reason why the sign *Cipactli* appears in the heel strap of the so-called *piernas colosales* ("colossal legs") of Tula, two pairs of which monoliths present eight knots or tyings, that is to say, precisely 416 years, since each tying has the value 52. The heel strap symbolizes the support, the basis of the entire cyclical edifice, the initial character of which is *Cipactli* at the same time the "lords of the night" close a complete round, and the *tonalámatl* finds itself exactly contained (584 times) in the period.

$$151,840 \text{ days} = 260 \times 584.$$

Admirable combination of observations, which prove no less patience and perspicacity than knowledge and genius in the people who made the basis of their chronology from such phenomenon.

A pictograph of Quich'e or Maya origin confirms the preceding, proving incidentally also the identity of the conceptions regarding the calendar between the Nahuas and the peoples of Chiapas and Yucatan. We refer to the famous "page of the Bacabs," second page in the Codex Cortesianus, published by M. León de Rosny. This painting indicates in essence the same great period; but it is expressed in Venus years. Within a peripheral zone which contains a total of 260 dots, there is noted a central square, in the sides of which, distributed in four groups, appear the twenty day characters of the month. These symbols do not present the normal order of their series: they alternate in a form apparently irregular, but which is in résumé the same as the initials of the Venus year, supposing that the twenty characters are applied to the measure of the movement of the planet, or be it that they run by successive periods of 584 days. Here is the order which they manifest:

| | | | |
|------------------------------------|--------|-------|-------|
| Imix (the Cipactli of the Maya) | Ik | Akbal | Kan |
| Chichan | Oc | Mamik | Lamat |
| Muluc | Ix | Chuen | Caban |
| Ben | Ezanab | Men | Ahau |
| Eb | Cimi | Cauac | Cib |

Replaced by the corresponding characters of the Nahua calendar, with insignificant variations, we shall have the four groups of the Venus calendar that appear on the pages already mentioned of the Borgian and Vatican B codices, and on the initial page of the Fejervary-Mayer. The conclusion is clear: Mayas and Mexicans computed simultaneously, by means of the *tonalámatl*, the movements of the sun and Venus, forming with this combination their chronological system: from which were born the cycles of 416 years.

o) Immediately connected with the pentagons, 14 wheels or circles are found. We do not attempt to decipher them, except to say that they designate the complete number of periods of 416 years which have passed from the creation of the world (in the native traditions) until the time of the construction of the monument; this would strengthen the idea that the Aztecs made it. Being 14 the cycles, they give the year 5804 of the Indian chronology; and in the year 1479 of our era the subjects of Axayácatl were in that of 5875. They were scarcely beginning the fifteenth period; they could not then mark it upon the relief. The conjecture is somewhat arbitrary, though not absurd.

There are eight other wheels, a little smaller, with respect to which we find ourselves equally in ignorance.

p) We arrive at the famous serpents, the two serpents which border the relief. They have been described many times; but as their precise significance was unknown, the descriptions have been confined within the generality and vagueness suited to the uncertain and involve crass errors.

In a general way (and this is certain though vague) it has been said that they allude to time. The serpent was in fact, among the aborigines of Mexico as among the Egyptians, the symbol of time, most beautiful symbol in truth. They have been called the creative dualism, Cipactli and Oxomoco (the inventors of the calendar), *xiuhtecuhtli* or the diurnal celestial arch, the pendent of the zodiac, etc., etc. The scales of the bodies have been considered as conventionalizations of fire (not erroneously; but there is something more concrete in them), the specialty, the strange signs of the back of the figures, which have given rise to many extravagances, being taken for plumes, for flames, for a rain of fire, and so on at fancy.

As to the human heads inclosed in the throats of the serpents, the mode of interpretation has been most varied. While Dr. Valentini attributed them to the reformer of the chronology (Votan according to some authors), Don Alfredo Chavero affirms that they are Ometecuhtli, that is to say, that they relate to fire as creator or *dios dos* (two-god). This conception of duality has greatly preoccupied the archaeologists—now in a general and vague form calling the figures creative duality, and even double duality, or the tetrany concept (Mrs. Nuttall); or seeing in them the inventors of the calendar; now nocturnal deities (Peñafiel); now the earth and fire; now in other ways. Abadiano declared that they were the sun and the moon. Chavero, man of undoubted genius, arrived at the suggestion that they were Tonatiuh and Quetzalcóatl; although he did not give precision to the conception, or express the reasons or the combination, and thus remained in generalities and indetermination which say little. There have not been lacking those who in these heads have seen Huitzilopochtli himself.

Nothing of all this is encountered in these figures. They are the deities who preside over the chronological periods of 104 and 416 years. It is the same idea as that of the Gladiatorial Stone, of the “page of the Bacabs,” of the famous cross of the Codex Fejervary. The attributes of the heads permit clearly identifying them. One of the

faces has the solar glyph on the forehead, the double cane or bunch of herbs, the nose turquoise placed transversely, the distinctive ear ornament (*nacochtli*); it is the star of day. The other face has a net and the *yacaxiuitl* of a form not well seen, but which differs from the *xiuhotecuhtli*. Having placed net and ear ornaments to both faces is the only defect in Iriarte's admirable lithograph; in reality, only the face to the right of the relief has the netting, lacking on the other hand the ear ornament. The other engravers (Engberg, etc.) saw these details with exactness.

The deity in question, face to face with one that represents Tonatiuh, is also met with in the stone called the Gladiatorial Stone. His headdress there presents a peculiar form, identical even to the position of the face, with the great figures of pages 43, 44, 45, and 46 of Codex Vaticano B; he has in his hand the plumed serpent of Quetzalcóatl and carries at the shoulder the sign *miquiztli*, because the planet Venus is considered of unfavorable augury. They are then two perfectly differentiated deities, whose combination forms the cycles of 104 and 416 years (65 and 260 Venus years); they are Venus and the sun.

In the edifice of Xochicalco only the figures which the first (Venus) give, are directly read by means of the *Cipactli* ($13 \times 5 = 65$); the solar cycles are understood only by equivalence and with dates. Papantla alludes directly to Venus years (65) and by equivalence to solar. Cholula was consecrated to Quezalcóatl. The "page of the Bacabs" and those of the Fejervary and Borgian Codices directly express 260 Venus years and symbolically the corresponding solar period. Only the relief of the museum, perfect conception, shows the grand circle engendered by the two stars which unite in order to produce it.

k) The serpents as time express indefinite duration; that which concretely denotes a *huehuetiliztli* is in the encounter of the faces, the union of the tongues. (Also the figure of the *Cipactli* appears in a certain mode to denote it, as we shall see later on.) But as the perfect correlation of the calendars came to be effected only each 416 years, it was necessary to state this number in some way in the bodies of the serpents, thus determining their chronological sense. No one until now has read this period there. Nevertheless, it cannot be more clearly indicated; it is in fact the most apparent reading of the monument, proving by itself alone the rest of the interpretation. The number is encountered in those groups of four little bars, distributed in the bodies of the serpents. Each group says *ácatl*, *técpatl*,

calli, *tochtli*, reading which has escaped the interpreters. They are the classic names of the chronological series: therefore they appear in the serpent of time.

Ah well, the total number of the bars attains exactly to 416, a fact which could not be a mere coincidence. There are 52 groups in each serpent, distributed as follows:

Groups of four little bars:

4 joined to the face enclosed in the throat of the serpent. Most of the engravings and drawings show errors here: the lithograph published in the second volume of the *Anales del Museo* is correct; also that of Iriarte, which is the best we know.

3 in each one of the 11 scales that follow, up to the tyings. In all there are 33 groups.

3 in the scale following the tyings. (Here Abadiano and Pedro Gonzales arbitrarily place other groups in the outer border of the scale. Gama, Iriarte, and Engberg are correct.)

5 in the terminal triangles of the tails. (From Gama on, all the lithographs seem correct in this.)

3 in the border of the relief above the triangles. (Gama overlooks these: the other engravers place them.)

4 in the bands which spring from the tails. (All have them.)

In total, there are 52 groups of little bars in each serpent; summed, they give 416 years, most eloquent and irrefutable confirmation of our interpretation. The first beginning with the character *Ce tecpatl* controlling, as the *copilli* shows, will conclude on the day 13-ácatl.

The stone presents a curious anomaly; in the mandible of the solar serpent there are four groups of little bars; but in that of Quetzalcóatl, a profane hand has attempted to place a fifth group, which has made the reproducers of the relief commit errors. Gama did not see these little bars of the heads and omits them in his drawing, otherwise sufficiently correct. Who could be the author of such an offense? Someone who had access to the monolith for having it modeled or some other circumstance; but as he lacked the skill of the natives, he made the group visibly imperfect, the bars result much more narrow, and they do not show the clear relief which without exception the others show. What was the object of the offense? To combine some of those arbitrary periods—Egyptian, Persian, Chaldean, or Hebrew—which they had desired to read on the Toltec relief. Always the archaeological discord of affinities with the Old World damaging the knowledge of autochthonous things!

j) The archaeologist Hermann Beyer interprets the figures stamped on the scales of the serpents as conventionalizations of fire; we find the supposition very probable. But each scale represents at the same time the renovation of a period of time (idea also proposed by Dr. Valentini); and that period can be nothing but that figured by the fire which they enclose: 52 solar years. As the scales are 24, the combination expresses 1,248 years, which added to the 416 of the little bars sum the 1,664 of which the entire age had to be composed. The number possesses another peculiarity—1,664 solar years equal 1,040 Venus years, a figure which was also considered sacred. On the other hand, if we sum 416 (taking them from the little bars) and 624, number obtained from the scales affected by the half-circle the same number, 1,040, will be obtained, this time referring to solar years. No one is ignorant of the extreme importance which the ancient Indians of Yucatan and the Plateau ascribed to their numerical combinations, which has given basis for tracing affinities between the authors of these sculptures and the old Pythagorean School (little probable in our opinion, though not impossible).

We repeat that the immediate, natural, and simple reading of the stone is that which corresponds to the data of the Toltec tradition: Three ages of the world have passed, and we find ourselves in the fourth, begun with *Ce técpatl*, and which will end with the year 13-ácatl. In this sense, the relief is neither more nor less than the expression of the historic sun or present epoch of its constructors, and it is in accord with the grand fresco of Teotihuacan, in which two high priests celebrate the renovation of a new epoch, symbolized by a great sun with four knots—416 years.

With respect to Aztec dates, it is possible to encounter them: but their reading is less obvious, though not strained. To admit it depends upon the inductive value which may be assigned to certain circumstances, such as the monolith having been found in a Mexican city, the fact that the year 1479 was 13-ácatl, the relationship of the Toltecs and the Tenochcas, the narrative of Durán, and the mathematical adjustment of the numbers 624 and 156 with the capital events of the history of the people of Motecuhzoma, accepting the year 700 as a point of departure.

We may add that Abadiano reads the number 1,664 in the border of the commemorative stone known as that of Tizoc (and in fact, it is found there), a monolith which he supposes closely related to that of the Calendar. But, apart from the fact that he claims to find in the relief an infinity of cyclical and chronological periods proceeding from

the Bible (the date of the Deluge, that of the confusion of tongues, etc., etc.), and others like the Sothic period of the Egyptians, a totally inadmissible hypothesis, he connects the date *13-ácatl* of the rectangle with 1352 of our era, date in his opinion of the foundation of Mexico; the statement is doubly false, for neither was Tenochtitlan founded in that year, nor was that year 13-cane in the native chronology, but *3-técpatl*, as the tables of Veytia prove. We saw before that 1323 was the true *13-ácatl*, and already it is known that the Codex Fuenleal refers the foundation of the Mexican metropolis to that time. Although his knowledge of archaeology was no great thing, it should be said that in his work *Anahuac* Tylor suggested that the date of the rectangle mentioned referred to this same year 1323.

Let us pass to another point. It has been claimed that the divisions of the body of the *xihcōatl* correspond to the constellations of the native zodiac, idea of the archaeologist, Hermann Beyer. Without opposing so fertile and strong a thesis, we will make some concrete observations. As well in the *Cipactli* of Xochicalco as on page 72 of the Borgian Codex, the 13 divisions manifestly indicate 65 Venus years: the chronographic characters in the codex and the accompanying dates prove it without any sort of doubt. In Xochicalco each front of the edifice has tyings for the value of 416 years, corresponding to the two sculptured *Cipactli*, and two more suggested by means of glyphs adjacent to the body of the monsters. These free symbols are 26 in each front; it may be seen with clearness in the magnificent plates of Peñafiel's book (*Monumentos de arte mexicano antiguo*) and in Castañeda's drawing, reproduced by Kingsborough. Summed to the 26 directly inclosed in the bodies, we encounter 52 glyphs of 8 solar or 5 Venus years each. Each front or side of the edifice then expresses the number of 416 solar or 260 Venus years, value expressly confirmed in the 8 respective signs of tyings. In the codex the sign of tying affected by two numerals accompanies the serpents. According to this, 104 years or 416 in the four serpents is the matter. If in the museum relief, the proposition had been to represent the constellations, they would not have been upon the serpents, but on the quadrangular base of the monument, the preserved part of which shows still traces of some; this thesis appears to us more probable than that of Mr. Beyer.

1) With respect to the knots or tyings of the relief, they might signify the same 416 years figured by little bars, since there are eight. The so-called "Colossal Legs" of Tula are nothing else but the

symbolism of this grand cycle, with the suggestive coincidence that there are two pairs of different size, each pair with eight knots (two for a leg), or be it the expression of 416 years. The *Cipactli* which they have on the heel strap confirms our interpretation, since the said character is the initial in the three computations: Venus calendar, solar calendar and *tonalámatl*. In the magnificent monument of Cuauhtemotzin, the architect (Señor Francisco M. Jiménez), probably without intention, reproduces the great sacred period, since pairs of columns with eight knots support the statue.

But what is currently admitted with respect to the knots or tyings of the serpents of the relief, is that they are of the value of thirteen years, indicating a *xiuhtlalpilli* of 52 years in each serpent and between the two the 104 years read in the meeting of the heads. As the period of 416 years is already expressed by the little bars, we do not find it inconvenient to accept this interpretation, which offers advantages of which we shall speak later. They are then the four *tlalpilli* of 13 years, which make up the period at the end of which the ceremony of the new fire took place; perhaps this is why they are seen united, while when the knots represent a complete cycle, each appears as separated from the others.

The dots of the serpents have been counted by Señor Chavero, who forms the year with them; we make a double reading encountering as a result of the first the *tonalámail*, and of the second 366 days.

p) We have not spoken of the seven stars which crown the plumes of the heads. The line that traverses them midway clearly indicates that they are stars. It has been said that they represent the Pleiades, mentioned by Sahagún in his description of the *xiuhmolpia* (festival of the renovation of the fire), and we have no reason for denying it. The meeting of the tongues representing a great cycle in which two *xiuhmolpia* fit, it is explained why these stars appear repeated, that is to say, why two groups of seven are counted in the plumages; each *xiuhmolpia* supposes the culmination of the constellation, signal indicated for the ceremony.

Let us state in this connection an hypothesis which does not basally alter the preceding. If the Mexican year began in the winter solstice, between December 21 and 26 as there are various reasons to believe, the constellation which then culminated at midnight is Orion and not the Pleiades. Orion shows clearly the form of a great butterfly, in which we ourselves recognize the beautiful Itzpapálotl (butterfly of obsidian knives, or of sparks) of the Indians. The Aztecs, not

seeing in the said constellation the figure of a warrior, but that of a gigantic butterfly of brilliant sparkling (a more beautiful conception), must have considered it formed of seven principal stars, three of the belt and four of the great parallelogram, whose corners correspond to the *eyes* of the butterfly's wings. This being so, we can already explain the figures of the butterfly which appears on the edge of the relief: they mark a succession of *xiuhmolpias*. The same sign is seen, among celestial signs, in the pages of the *tonalámatl*; and here we recall that in the Mixtec codex from Santa María Yolotepec there is a butterfly placed upon a throne. It is to be noticed also that this figure is the *motif* par excellence of many worked stones in the museum and of stones, slabs, columns, and figures of great size.

It seems more natural that a primitive people should take into account, at the solemn moment of making the new fire, the movements of a great constellation like this butterfly than of the little group of the Pleiades. We repeat that it is reasonable to see in Orion the symbolical *Itzpapálotl*, so many times mentioned in the codices; we believe that it is this which is represented by the stars of the plumes. It will be noticed that there are fourteen: this is natural, because in the *huehueticatl* the constellation culminated twice, marking the beginning of a cycle.

j) Let us see the figures of the inner border of the serpents. They have been called *Cipactli*, phonetics of water, plumes, half-plumes, clouds, flames, rain of fire, and various other things. We believe it probable that they are conventionalizations of fire. But the groups of four stout bars in which they terminate, by their unusually regular form, their position, and their arrangement, are clearly shown to be numeral signs. In agreement with the general meaning of the relief, we can do no less than to assign to them the value of 416 years, or what is the same, each flame symbolizes the *huehueteotl* of the center with four numerals. The supposition is not at all forced; a modern artist, before a similar problem, would not proceed very differently. On the other hand, the thesis of Señor Abadiano is unacceptable, since he claims to find in the combination of the flames the years anterior to the Christian Era, in which the family of Israel penetrated the Promised Land. The relief cannot refer to that event.

But it is evident, from the position of the glyphs, separating almost from the serpent of time, that they refer to past epochs, in contradistinction to the present, which is displayed in the body of the serpents, allegory as simple as beautiful. Therefore, the serpents have

life, open their throats, and have upon themselves indications of time past and data of that which ought to follow.

Our reading of the flames offers this surprising result: it indicates the date 4992, date mentioned in Ixtlilxóchitl as the end of the third age of the world. By error, in the edition made by Chavero, the date 4996 appears; but as the Texcocan chronicler himself adds that between this date and that of 5097 or *Ce técpatl*, with which the Toltecs began their era, there was an interval of 104 years, it is evident that the year is 4992. This is that which the flames of the relief indicate; the value which we have attributed to them is thus confirmed. Adding the number of 104 years, of the meeting of the heads, we arrive exactly at the 5096 of the world in the chronology of the Indians, which was a 13-ácatl year.

This last date being inscribed in the frame which the two serpents indicate with the tips of their tails, it appears to us that the stone says *what is here read: that the number of the year figured in the body of the symbolical beings is 5,096*. In other words, that the date in question was 13-ácatl.

Moreover, our reading shows what device was employed by the Indians to escape the defect of their system, which causes the dates of each 52 years to become confounded with each other: to repeat them in different modes, when they were important. Thus every reason for equivocation ceases.

n) Many authors have seen in the glyphs of the projection of the monolith the Milky Way or the symbol of the firmament. They appear in analogous fashion in other monuments, such as the stone called the stone of Tizoc and a multitude of *cuauhxicalli*. They are *técpatl* which face each other and figures in which we see the constellation Itzpapálotl. There are in the museum many stones where the butterfly occupies the principal place in a large sculptured surface.

The said signs in the relief counted, and attributing to them the value which, in consonance with the rest of the interpretation, ought to correspond to them, the date 4992 before read is repeated. There are thirty-two butterflies and thirty-two groups of *técpatl*, that is to say 64 elements of the last class. The fact that these face each other might strengthen the thesis that the monument expresses Toltec conceptions. We know that that people began their chronological counts by *técpatl*. Ah well, if a *xipoualli* (cycle of 52 years) began with the day *Ce técpatl* in a year of the same name, the first day of the following

cycle also would be *técpatl*, which may make clear to us the position mentioned. A value of 52 years being assigned then to each group of these symbols, we obtain the number 1,664, that is to say, 3,328 in all. The butterflies complete the year 4992 already read on the face of the monument. If this is but a coincidence, there could not be one more extraordinary.

Why have not the three ages been represented by the same glyph? One hypothesis occurs to us: Orion or the Pleiades were not selected to mark the new fires until the third age; before that, either they had properly no history and the counting of the earlier epochs was a simply theoretical concept, or they did not attend to the astronomical phenomenon for dividing the cycles.

We may add that Señor Abadiano sees flowers in the figures which we take as Itzpapálotl; in his conception they signify the last of the day signs of the month, which was *xóchitl*. He gives no attention to the signs of stars (circles with a line across the middle) which make up the butterflies in question. The little stars alternate with *técpatl* or flint knives, symbol expressive of luminous gleams, sparks, flashings: the glyph unquestionably treats of a constellation.

We have analyzed and discussed the glyphs of the relief, avoiding arbitrary assumptions so far as possible. The majority of our interpretations are supported in important monuments, and among themselves they are found in harmony on the stone, the explanation of which results congruent, complete, and unitary. It could not be otherwise: a monument of such magnitude necessarily responds to a clear and logical thought.

As Beyer has said, many of the principal theories offered do not stand scientific criticism. The central face and the four quadrangles which inclose the symbols of the ages have been satisfactorily explained; there are hypotheses, susceptible of verification, concerning the dates inscribed near to the sun's face; the fives, the solar glyphs, the pentagons, and the dots of the body of the serpents have been counted, but only of the last does any reasonable explanation exist (Chavero hit the mark very well in the interpretation of the 104 solar glyphs); and nothing or only ambiguous, poetical, and indefinitely general conceptions have been formulated concerning the pentagons, the plumes or flames, the true meaning of the serpents, the heads inclosed in their throats, the groups of four bars, the great numerals of the center of the stone, and the glyphs of the projection of the relief. Also

attention has been called to the dots on the margin of the stone; but the mode of interpreting them rested upon a false assumption.

With respect to the date of the quadrangle above, there may be no mode of determining it, as it may express at once various important dates in the past of Mexico. The sign upon the forehead of Tonatiuh, the dates *Ce quiáhuitl* and *Chicome ozomatli*,¹ and a definite decision when the stone was made and who worked it remain in doubt. But that it expresses the Toltec chronology based upon the cycles of 104 and 416 years, engendered by the movement and calendars of two stars, we believe is now a conquest of science. Our explanation, harmonious in its other parts, still has two gaps in it: the five solar glyphs at the base of the arrow of the *naolin* and the numeral located in the same place. Perhaps these may be the five intercalaries of the end of the year; their position indeed suggest it.

In résumé, the Indian century or cycle of 104 years appears:

In the face of *huehuetéotl* (metaphorically);

In the circle of the solar glyphs (directly): (104);

In the heads which join each other: ($52 + 52 = 104$).

The *xipoualli* or bundle of 52 years:

In each scale or division of the body of the serpents;

In the tyings of the serpents, assigning to them the value of a *tlapilli*;

In the butterflies and the *técpatl* of the projection or edge of the stone.

The cycle of 416 years appears:

In the great numerals which surround the *huehuetéotl*;

In the pentagons distributed in four groups of 13 ($4 \times 13 \times 8 = 416$);

In the groups (52 in each serpent) of four little bars: (directly): ($52 \times 4 \times 2 = 416$);

In the flames of the back of the serpents: ($104 \times 4 = 416$).

By equivalence:

In the numerals (260) distributed in fives.

The year appears in the body of the serpents; there also the *tonalámatl* is encountered, and at the same time it is possible to make the reading of the period 1,040 in its glyphs and especially of the great era of 1,664 years, repeated four times in the rectangles of the center.

¹ I believe that these dates express a *correction*: that is to say, the actual difference of time which is produced at the end of 416 years, between the respective positions of the sun and Venus. If this is so, these dates constitute, pre-eminently the astronomical touchstone of this admirable monument.

We may add that the general representation of the monument is of years and not of days, a fact which for the most part has escaped archaeologists; for this reason they did not succeed in the reading.

The stone expresses directly (that is, with signs of fixed value among the Indians) the dates 4992, 5096, 5097, of the Indian chronology; also the years 624 and 780 may be read, which added to the last (itself being included) read 5720 and 5876 of the Indians, which correspond to 1323 and 1479 A.D. The former is the date of the founding of the city of Mexico; 1479 is a year in the reign of Axayácatl.

The date 4992 appears twice, that of 5096 once. *Ce técpatl* is the year following, 5097 (700 of our era). Inferentially it is possible, and not inconsistently or by straining the truth, to encounter the date 1064 of the Christian Era, date of the exodus from Aztlan. This would suppose that the date of the tablet is not 699 A.D., but 1479; an exact cycle of 416 separates this from 1064, an observation which did not escape Dr. Valentini. We ourselves arrive at it in a different manner:

$$1064 \text{ (inclusive)} + 416 = 1,479.$$

Ixtlilxóchitl gives the years 4992, 5096, and 5097, and Orozco y Berra admits them; Clavijero also has the date 4992 (596 of the vulgar era) setting at it the arrival of the Toltecs upon the Plateau; the Texcocan historian asserts the same. Motolinia (with a difference of six years), and the *Anales de Cuauhtitlan* mention the year 5097 (700 of our era); the date is assigned as that of the foundation of Tula, or, perhaps better, as that of the election of the first monarch; thus Chavero understands it. Torquemada states it, referring it to the king Totepeuh. We believe it more probably should be the beginning of an era, as Fray Toribio and Gómara declare. The illustrious writers, Count Juan Reinaldo Carli and Juan Carlos Buschmann, also name it, having encountered it in their investigations.

The canon Ordoñez de Aguiar gives approximately the year 343² of the natives (964 B.C.) alluding to the Quich'es. Chavero admits it with reference to the Vixtoti. The *Anales* mention it in connection with the Ulmeas, from which we infer affinities between these peoples.

Tezozomoc, Chimalpahin, Veytia, and Gama mention the year 1064 of our chronology as the date of the beginning of the wanderings of the Aztecs; and it is inferred from the *Tira del Museo*, codex which places the exodus of the Aztecs from Aztlan 183 years before the fire

kindled in Chapultepec, which event took place in 1247 according to the study of Don Alfredo Chavero. Clavijero and Humboldt thought the same.

The year 1323, named in the Codex Fuenleal or Icazbalceta, is that of the foundation of Tenochtitlan, when the Indians began to construct substantial houses, an event somewhat subsequent to their finding the cactus (*nochtli*) as is inferred from the comparison of the data of the *Anales de Cuauhtitlan* and of the Codex Aubin. The said year 1323 corresponding to 5720 of the aborigines may be found on the monolith.

Finally, the year 1479 of our era is the one mentioned by the friar Diego Durán and may be referred to the *13-ácatl* of the tablet. Nevertheless, this native date fits equally to the dates 1323 and 699 A.D. Perhaps the triple anniversary, the triple *13-ácatl*, gave origin to the construction of the relief, admitting the latest of the dates (1479); in no case, however, was it the beginning of the historic or fifth sun, as Seler, Joyce, and Spinden claim, because the new era, for the Toltecs as for the Mexicans, who afterward adopted the *tochtli*, began with *Cetécpatl*, sign inscribed near the face of the sun, where such a meaning truly fitted it. We will say again: either the subjects of Motecuhzoma were a family from the Toltec trunk, or the great stone of the museum is a monument of the race of Quetzalcóatl and Huemántzin.

Our interpretation is supported upon the authorities quoted; at the same time they receive irrefrangible weight which the stone, from today even more than ever, the first chapter of the history of Mexico, gives them.

THE FIRST CHAPTER OF MEXICAN HISTORY

Founded then in the monument itself and other authorities who present data in agreement with it, we believe that we can assert, now with certainty, the following facts:

The Toltec race has a historic reality and attained notable advancement.

It arrived on the Mexican Plateau about the year 596 of the Christian Era; there were just ending, in particular in the valley of Mexico, violent manifestations, probably eruptive, which buried under their lavas human relics and fossils of the Quaternary and Pleistocene. This was the catastrophe to which they attributed the end of the third age of the world, considering the remains of the animals that they found to be those of giants. Apparently the flows of *tezontle* (lava of

Ajusco, of Xictli, and of the Sierra de Santa Catarina), described with so much precision by the *Anales de Cuauhtitlan* when it says that "the red rock boiled," date from then.

Toward the year 700 the Toltecs were organized and elected a monarch, establishing themselves in a city to which they gave the name of another older one where they had lived in earlier times. There are reasons to believe that the first Tula, or at least the ancient place of origin of the people of Huemántzin, lay to the southeast, in the famous kingdom of the Quich'es of Chiapas, race with which the Ulmechas present more than one affinity, and the first notices of which date back to about a thousand years B.C. Only the southern fertility and the opulent resources of that zone could engender in primitive times a culture such as that attained by that people. When the Toltecs established themselves on the Plateau, we must believe that they were already civilized. If by any chance, they came from the north on the last occasion, the origin of their culture must anyway have been in the southern districts. This is so much the more likely, since there are data of the fall of an empire in Yucatan toward the end of the sixth century A.D., which perhaps started the migration that appeared on the Plateau in 596.

The Toltec power ended about 1070-1116; but the capital elements of their civilization were transmitted to the surviving races, and at the time of the Spanish Conquest, the Acolhuas, Mexicans, Mayas, Mixtecs, Zapotecs, etc., etc., preserved them in greater or less degree. All accepted the same chronological system, which is the original and loftiest contribution of the aborigines to human culture; it is necessary to attribute it to a race which has served as trunk to the others, or which has at least, imposed its culture upon all. Tracing back in the traditions of the peoples most widely separated geographically and most foreign to each other in their languages (Cakchiquels, Mayas, Nahuas, etc.), the name of the Toltecs is always found. It is not impossible that these have received from the Ulmechas some elements of culture, which they developed until bringing them to their maximum flower and splendor; barring that they were the Ulmechas themselves.

Also, the various races, inhabitants of the ancient territory which today is Mexico, resembling each other in many characteristic qualities, reveal an extraordinary artistic tendency; in the greater number of cases they applied this skill to expressing the ideas of the theogony, the cosmogony, and principally of the astronomy and chronology

which were in essence derived from the Toltecs. Grandiose in architecture, skilled although not perfected in painting, they surpassed in sculpturing stone and had no rival as decorators. Most beautiful their stucco decorations and works in freestone; their sculptures and reliefs in hard rock are masterpieces, unsurpassed as to beauty and workmanship in any country of the earth.

In the year 1064, the tribe of the Aztecs, also of Nahua race, undertook a pilgrimage, going out from a place the exact location of which is not yet known; it is nevertheless a fact—the codices state it—that the Aztecs began their journey in water craft.

In 1227 they arrive at Chapultepec and in 1247 kindle the new fire in that place. Their chronological system is the same as that of the Toltecs; the cycles of 52 years show it.

In 1323 they definitely found the city of Tenochtitlan; a little before, ten or twelve years, they had encountered the eagle upon the cactus. About 1479 a grand cycle of 416 years from the beginning of their pilgrimage was completed, a fact which the Aztecs celebrate with extraordinary sacrifices and festivities; perhaps then they constructed a notable commemorative monument.

Finally, 13 years (a *tlalpilli*) before the chronological cycle (104 years) should end, reckoning from the creation of the world according to their ideas, the Spanish conqueror arrived, and in the year *Yci calli* (1521) the empire of the Mexicans was destroyed, the last of its monarchs being the hero, whom they symbolically called "The Eagle Who Falls." The year 1521 A.D. was 5918 of the chronology of the autochthonous nation. As an original and most valuable contribution to human culture it left, as we have already said, its arts and calendar, which is based totally on astronomical observations. Arts, history, and calendar are found in synthesis in the stone of the museum.

NAME AND POSITION OF THE MONOLITH

As concerns the name of the stone, considering that it is the sum total of the chronological system of the aborigines, founded in mathematically defined cycles, none is more exact than that proposed by Don Alfredo Chavero, the "Mexican Cyclographic Stone"; but we believe that it will not be possible to displace the designation "Aztec Calendar," imposed by the first eminent interpreter of the monument, and by which it is universally known. Strictly it is a calendar, in the elevated and broad sense, since it contains the measure of time; but we cannot absolutely assert or deny that it is Aztec work. The name

"Stone of the Sun" fits without doubt, though only partially since it is really "Stone of the Sun and of Venus."

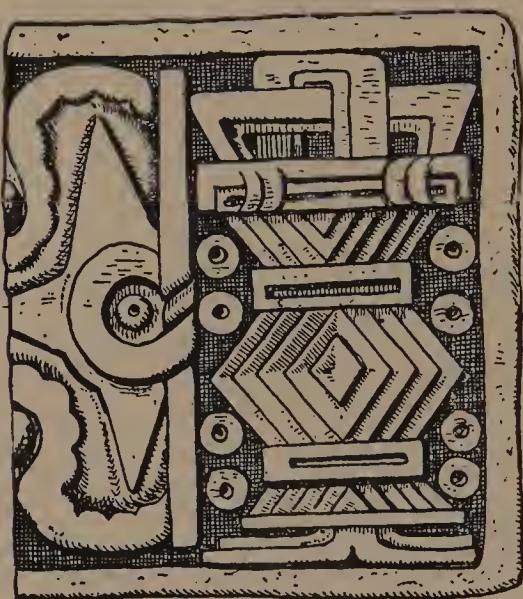
Concerning the position in which the Aztecs maintained it, we cannot bring ourselves to admit that it was placed horizontally. Incredible and even absurd to sculpture, with infinite art and labor, such marvelous works that they should remain almost concealed! Nevertheless, Seler, following Chavero in this as in some other points, holds that the purpose of the stone was the practicing of sacrifices upon it, attempting to identify it with a simple *cuauhxicalli*, which had wrought upon it the face of the sun and the signs of the days. It is well understood that this stone was something of much less importance than the relief of the museum, synthesis of the history of the world and of the science of the aborigines. Much less can we admit, as Mrs. Nuttall claims in her erudite study (*Key-Notes of Ancient American Civilizations*) that it was placed in the ceiling of a building with relief downward, in such a position that certain of the symbols were to the east; the thesis is so strange that we will not discuss it.

No, the central Tonatiuh, in the height of the zenith, with the claws opened, magnificently suspended in space, eloquently proclaims how the natives placed the monument. In the imagination of those men, the sun, when he crosses the firmament suggested an eagle cleaving space in his powerful flight; and, in fact, the star of day and the eagle appear intimately associated in the codices. They called the sun Quauhtleuatl or Quauhtleoauitl, "The Eagle That Ascends." On the other hand, the dates inscribed below the arrow, giving them the meaning ascribed to them by Gama and Chavero, result without sense under the preceding unacceptable theses. The sufficiently probable theory that the stone was used in the mode of a solar time-piece, by means of gnomons, the sockets for which are clearly preserved, also falls to the ground. Lastly, how could the point of the arrow indicate the meridian of Mexico, if the monolith were in a horizontal position?

It is necessary to convince one's self of this: the relief was placed vertically in the great *teocalli*, as we see it today, although with its face to the south and oriented exactly with reference to the east and west. If this stone is the one described by Durán, we must suppose that they laid it down in order to make sacrifices upon it; but, the cruel ceremony ended and innumerable victims sacrificed to the god of blood, they would again erect it in the only position admissible, that

in which the Indians could contemplate the face of their deity and read the *Teoamoxtli*, the marvelous page written on the surface of the relief; the history of the world divided into periods of 416 years, formed by the continuous gyration of the 20 days of the month, of the 260 days of the *tonalámatl*, of the 365 days of the civil year, of the 2,920 of the Venus period, of the 18,980 of the sacred cycle in which they adjusted the tying, of the 37,960 of the greater cycle in which the movements of the sun and star combine, and of the 151,840 of the great era in which all the elements of the chronology harmoniously adjust their admirable mechanism. And as religion and time measurement formed with the observation of the heavens one single body of ideas, the stone came to be actually the sum total of the mythologico-astronomical conceptions of the natives.

In the cycle of 52 years the elements of the solar calendar closed their round, in order to repeat themselves in the following period: this was the famous festival of the making of the new fire, of which all the histories speak. The cycle of 104 years, adjustment of the calendars of the sun and Venus, was much less celebrated, because of its long duration; the citation from Sahagún and the hieroglyphs of codices and monuments demonstrate, nevertheless, that the Indians considered it also, certainly with extraordinary solemnity. Lastly, the great period of 416 years, of extreme amplitude, was rather a calculation of mathematicians, a theoretical rather than practical arrangement; nevertheless, the occasion for its celebration presented itself once during the history of the Aztecs: when the people of Tenoch counted 416 years from the time of their exodus from Aztlan. It occurred in 1479. The unusual importance of the anniversary explains the construction of so grandiose a monument: they desired to stamp thereon, succeeding admirably, the fundamental ideas of their culture and the supreme dates in their past. The great stone of the museum, Cyclographic Stone of the pre-Columbian civilizations of America, is certainly the stone of the history of the world, according to the cosmogony and beliefs of the Indians, and in particular of the history of the constructing race up to the moment when the monolith was erected. We know of no people which has raised another more admirable and marvelous.



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